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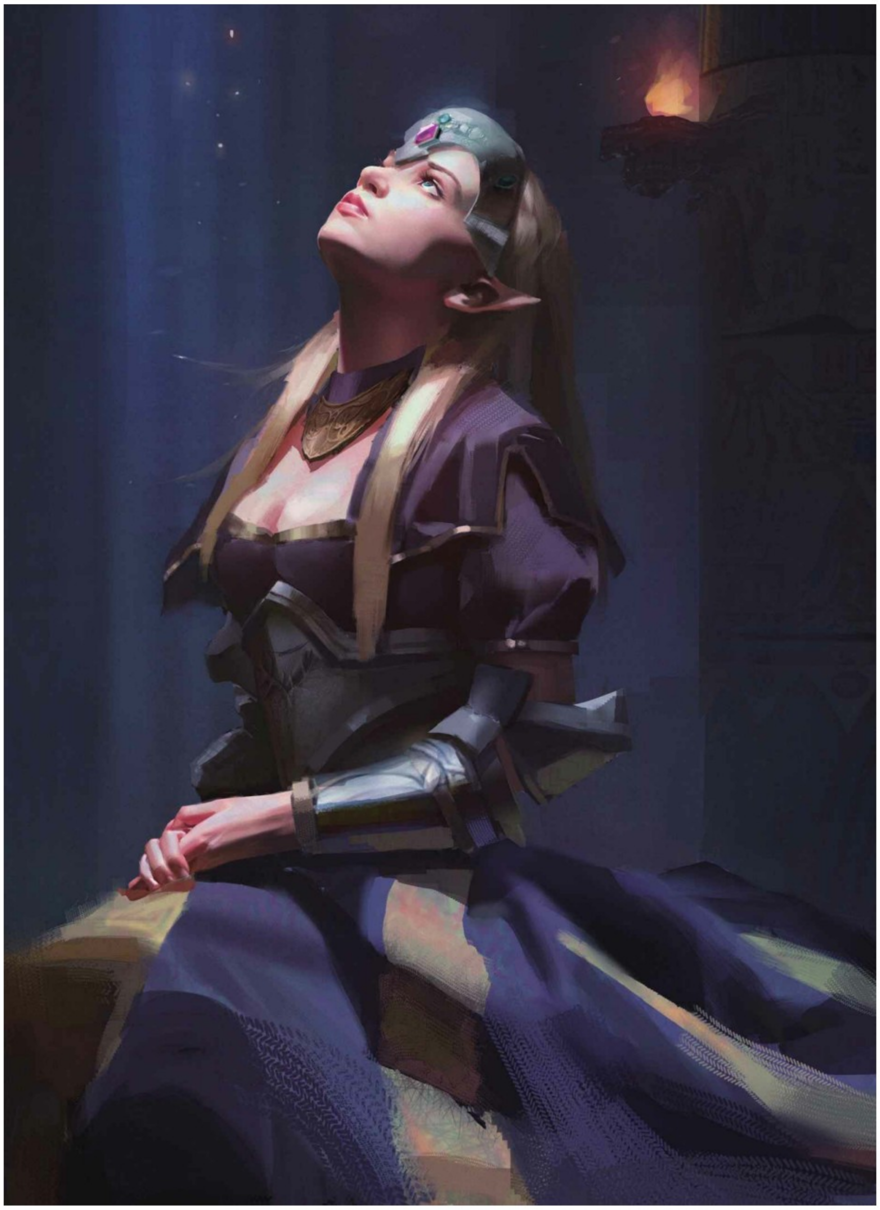
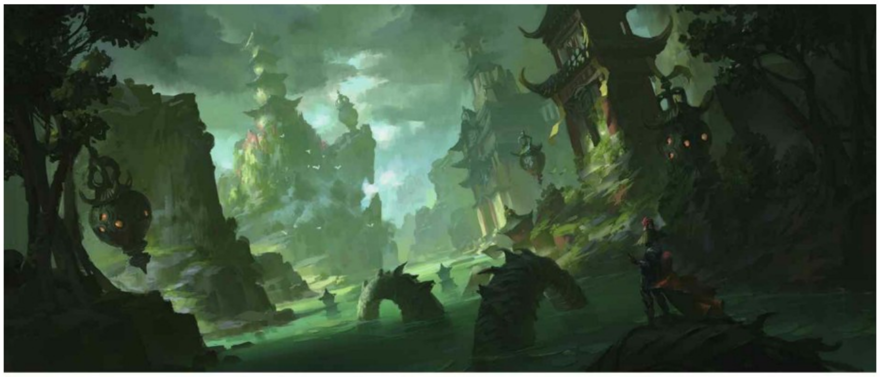
Summary

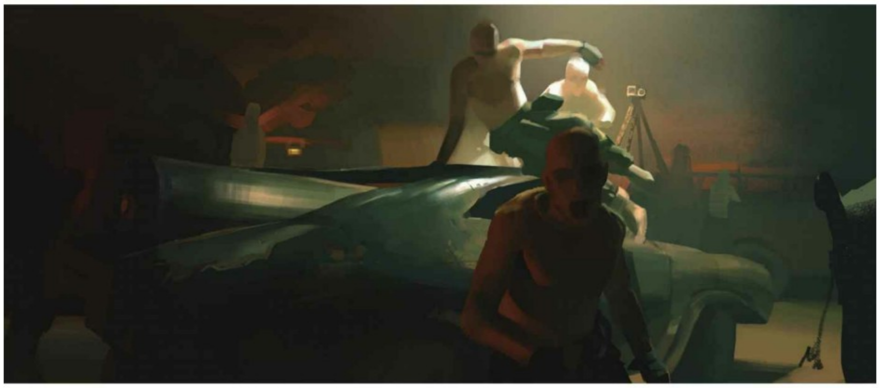
This book summarizes the thoughts and insights of the two teachers in their work and teaching exploration. Through systematic and diversified teaching methods and painting demonstrations, it guides readers to learn comprehensively and systematically, avoid detours, and lay a solid foundation in figure drawing.

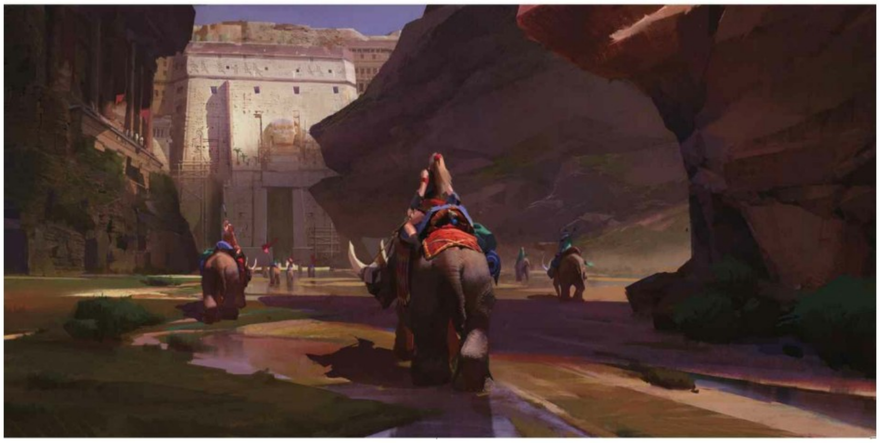
The book employs a modular, specialized practice format, breaking down the human body into several parts such as the head, torso, arms, legs, hands, and feet, providing in-depth analysis. It then integrates these parts with perspective as the core, offering specialized training in human body rotation and dynamics. Finally, it tests the reader's understanding of human anatomy through two specialized exercises focusing on light and shadow and clothing folds. The content is logically structured, with a clear and concise knowledge framework. This book is suitable for

beginners in human anatomy, art students, and experienced professionals to learn and solidify their fundamentals in human anatomy, and to solve various problems encountered in daily practice.









Foreword

Do you always feel that your figures lack three-dimensionality when drawing them, and do you have a vague understanding of human perspective and structure? Are you frustrated by the lack of a systematic method for practicing human anatomy to guide your daily practice?

Towards?

Do you aspire to enter the animation and gaming industry but unsure where to begin? Many

people are very interested in animation and gaming and want to enter this field, but are hindered by various factors—the market offers a wide variety of drawing tutorials of varying quality, making it difficult for beginners to choose a complete and suitable learning system; enrolling in classes is risky due to time constraints or the high cost; self-study is time-consuming and laborious, and without professional teacher feedback and advice, it's easy to feel lost and unable to find the right learning direction, potentially leading to detours and even giving up on drawing altogether. To address these issues, we have combined years of practical work and teaching experience, spending two years collaboratively writing this human anatomy training tutorial. This book, with its logical organization of knowledge points,

pacing of exercises, and quality of practice diagrams, meets the actual needs of readers, helping them quickly transform from human anatomy drawing novices to experts. This book will open the door to the field of animation and gaming drawing for readers with zero experience, from the perspective of a professional drawing instructor.

During the practice, readers need to follow the knowledge structure arranged in this book and complete the exercises step by step from front to back, learning and consolidating the knowledge points of one stage before moving on to the next stage. Then, if you persevere, you will surely succeed!

To improve the efficiency of drawing practice for beginners, here are 5 suggestions: • Set a small goal.

For beginners, an initial goal could be to practice drawing every day.

Small, achievable goals include drawing for 10 minutes or completing one figure drawing exercise daily. This requires some basic drawing skills.

Afterwards, goals could include creating a relatively complete promotional product design, finding a job, and improving skills through practical experience. It's important to summarize experiences at each stage, gradually forming habits; with consistent effort, progress is guaranteed.

- Increase practice time. Change your daily practice from 10 minutes to 30 minutes.

Draw for an extra 20 minutes.

- Find a practice method that suits you better. Based on the theories presented in this book, discover your strengths and practice them. • Draw things you

don't like or aren't good at. Most of what interests you is what you have strengths and are good at. Once you've mastered the things you don't want to draw, your confidence will increase, and you'll be more willing to do more of these kinds of exercises.

- Practice actively. Persistence is painful; if you say you've been consistently drawing, it might seem like...

It's clear you're not enjoying drawing; you're essentially resisting it. If you're finding enjoyment in drawing, I suggest posting your work online to get likes and comments, boosting your confidence. This will encourage you to draw more actively and improve your skills. Active practice is far more effective than passively making plans and forcing yourself to complete them, because passively doing things often leads to giving up.

Finally, I would like to thank the editors of People's Posts and Telecommunications Press for their help, and thank the readers for their recognition and support.

Shi Tong TC Morning,

July 2021

Resources and Support

This book is published by Shuyishe, and the Shuyishe community platform (www.shuyishe.com) provides you with follow-up services.

Access to supporting resources online

Over 1000 human figure modeling practice diagrams

Included with the book

Human anatomy training pull-out human

anatomy dynamic fold-out

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Chapter 1 Head-Specific Training

exist When learning to draw the human body, many people often start with the head. A beautiful head... The head can become a highlight of the drawing. This chapter will explain in detail the proportions, volume, structure, and skeleton of the head. This includes the understanding of angles, helping readers improve their spatial reasoning skills and learn to deduce the spatial relationships of the human head based on volume, thereby drawing an attractive head.

1.1 Head proportions

Mastering head proportions is crucial during the learning process; accurate proportions are fundamental to drawing a good head.

1.1.1 Overall Proportional Analysis of the Head

In drawing, the human body is usually studied using the "head length" (excluding hair) as the basic unit.

The proportional relationship between parts and the whole, and between components.

The head-to-body ratio for most adults is 1:7 to 1:8. However, in actual painting, the style of figures varies.

The head-to-body ratio will vary depending on the style. A 9-head ratio is considered

a model's body proportion and is suitable for depicting figures in clothing illustrations.

special.

7-8 head-tall: This is considered a normal human body proportion and is suitable for representing most painting styles.

thing.

6-head-high: Suitable for depicting girls aged 12-16. In practice, the upper body can be shortened and the legs lengthened. 5-head-high:

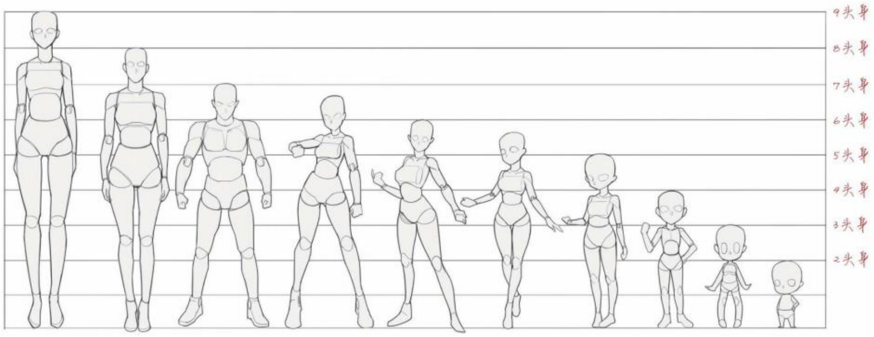
Suitable for depicting

children aged 8-12, such as boys in manga. 4-head-high: Suitable for depicting children aged 6-8. 3-head-high: Suitable

for depicting children aged 3-5, and chibi-style characters. 2-head-high:

Suitable for depicting infants aged 0-2. The head and body each occupy half the height, but the head is larger than the

body, making the character appear cute and adorable. It is also commonly used for chibi-style characters.



hint

In painting, besides the common head-to-body ratios mentioned above, there are some special head-to-body ratios, even one as high as 1:12. These have no fixed standards and must be selected and controlled based on the specific characteristics of the figure being depicted.

1.1.2 Analysis of Facial Proportions of the Head

When it comes to facial proportions, those who study art are likely familiar with the concept of "three courts and five eyes." But what exactly is "three courts and five eyes"? Does every form of painting have to follow this proportion? Let's explore these two questions in this section.

- The concept of "three courts and five eyes"

The "three courts and five eyes" principle is an important proportional reference when drawing a

human face. The "three courts" are the upper court, middle court, and lower court. In standard facial proportions, the height of these three courts is almost equal. Upper

court: the area from the hairline to the brow bone.

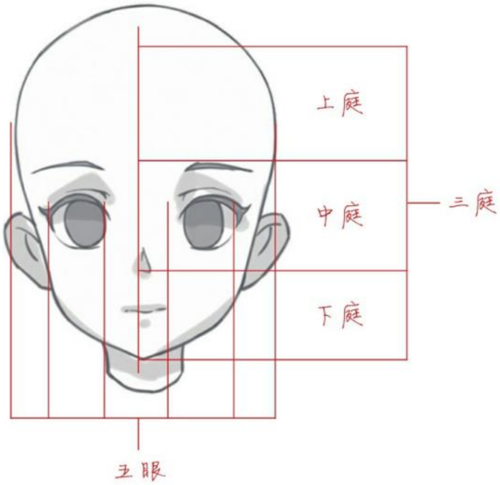
Middle court: the area from the brow bone to the

base of the nose. Lower court: the area from the

base of the nose to the chin. "Five eyes" refers to dividing the widest part of the head into five equal parts. In realistic paintings, these five parts are of equal width, while in other styles such as Japanese art, they are not necessarily divided equally.

In addition, two points should be noted: First, the brow arch refers only to the front of the eyebrow, not the tail; second...

When measuring and dividing the five eyes, the part of the ears should be removed from the widest part of the head.



Having understood the basic concept of "three courts and five eyes," we will now explain how to apply this concept in actual painting. Fundamentally,

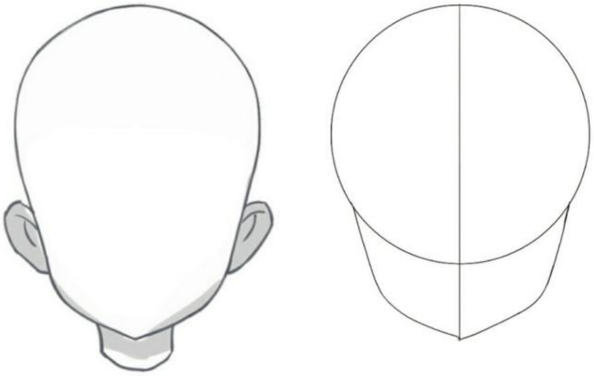
the concept of "three courts and five eyes"

was proposed to help determine the facial features.

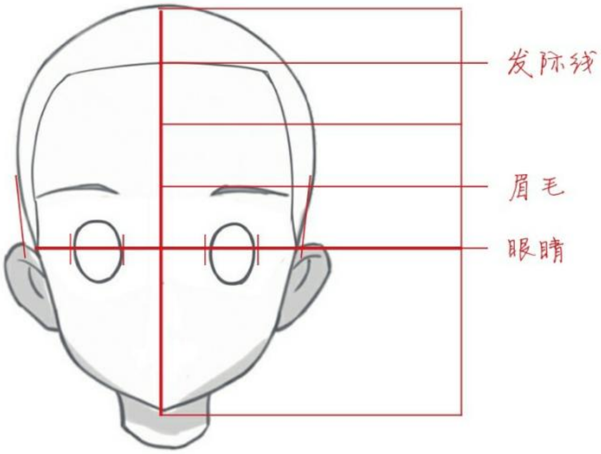
Position and proportion. When determining the position and proportion of facial features, pay attention to the drawing steps.

The following uses the frontal view of the head as an example to explain the application of the "three courts and five eyes" principle. The specific drawing process is as follows.

01. Draw the basic outline of the head, with an aspect ratio of approximately 2:1. You can start by drawing a circle, then draw the chin downwards, and finally adjust it to get the frontal head outline.



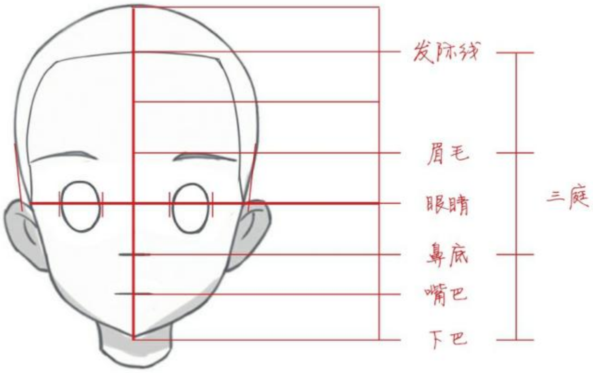
02. Draw a cross on the face. Divide the horizontal line of the cross on the face into 5 parts to determine the position of the eyes. Divide the area from the horizontal line of the cross on the face to the top of the head into 4 equal parts to determine the position of the hairline and eyebrows.



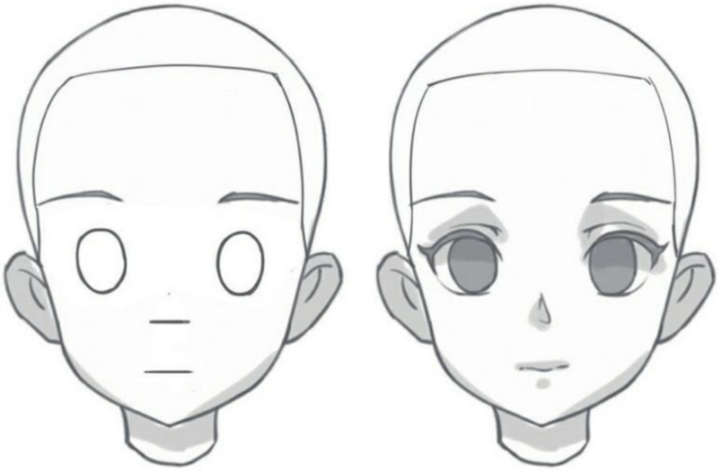
hint

The height of a person's hairline varies, and its position can be adjusted appropriately within the standard proportion as needed.

03. Once the hairline is determined, the area from the hairline to the chin is divided into three equal parts, representing the "three courts". Based on the proportions of the "three courts and five eyes", the positions of the brow bone and the base of the nose can be calculated. Finally, the position of the mouth is determined in the middle of the lower court.

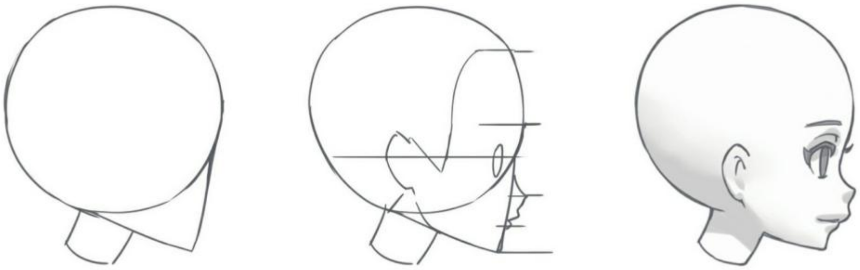


04. Draw the details of the facial features, and the frontal head drawing is complete.



Following the method for drawing a head from the front, you can draw a head from the side. If you find that the head is not drawn well...

See, you can check where the proportions are not drawn accurately by following the steps above.



hint

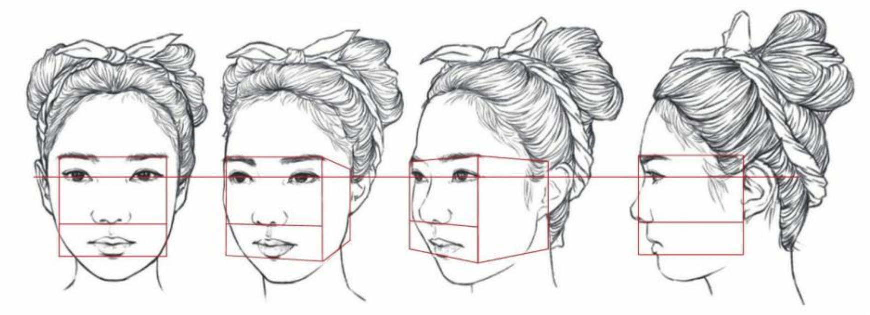
In realistic painting, the lower part of a figure's face is the base of the lower lip, not the lip crease as we might imagine. In anime and other styles of painting, the position of the mouth can be adjusted appropriately to suit the desired effect.

• Calculation method for scaling the proportions of the "Three Courts and Five Eyes"

After understanding the concept of the "three courts and five eyes" of the head, it is important to pay attention to the scaling of the head proportions. The problem.

By incorporating proportions into perspective representation, perspective scaling can be achieved. Studying perspective allows for the quick determination of facial features even when perspective angles are present. Let's look at the following set of portraits; [the text abruptly shifts to a different topic]...

It's much easier to understand if you simplify the facial features by thinking of them as a cube.

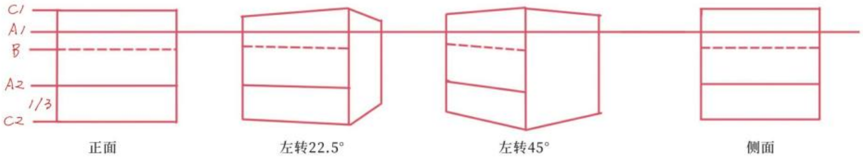


hint

The reason for choosing to use a cube instead of a cuboid for calculation is that a cube is very easy to become a quantitative standard after rotation, while a cuboid is not convenient to calculate perspective proportions after rotation.

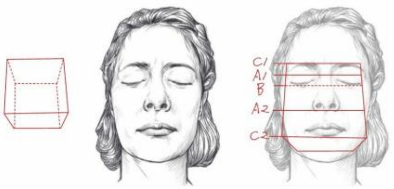
Looking at the diagram below, we can see from the "three courts and five eyes" principle that the height from C1 to A2 in the middle court is twice the height from A2 to C2.

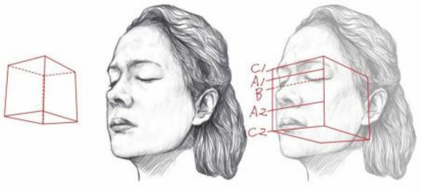
Divide the cube into two equal parts by drawing an auxiliary line B, from C1 to A2. A1 (the position of the eyes) is approximately halfway between C1 and B. Once this proportional relationship is established, we can quickly determine the positions of the facial features even if the cube is rotated arbitrarily.



This method can also be used to determine the position of facial features from other perspective angles, and can...

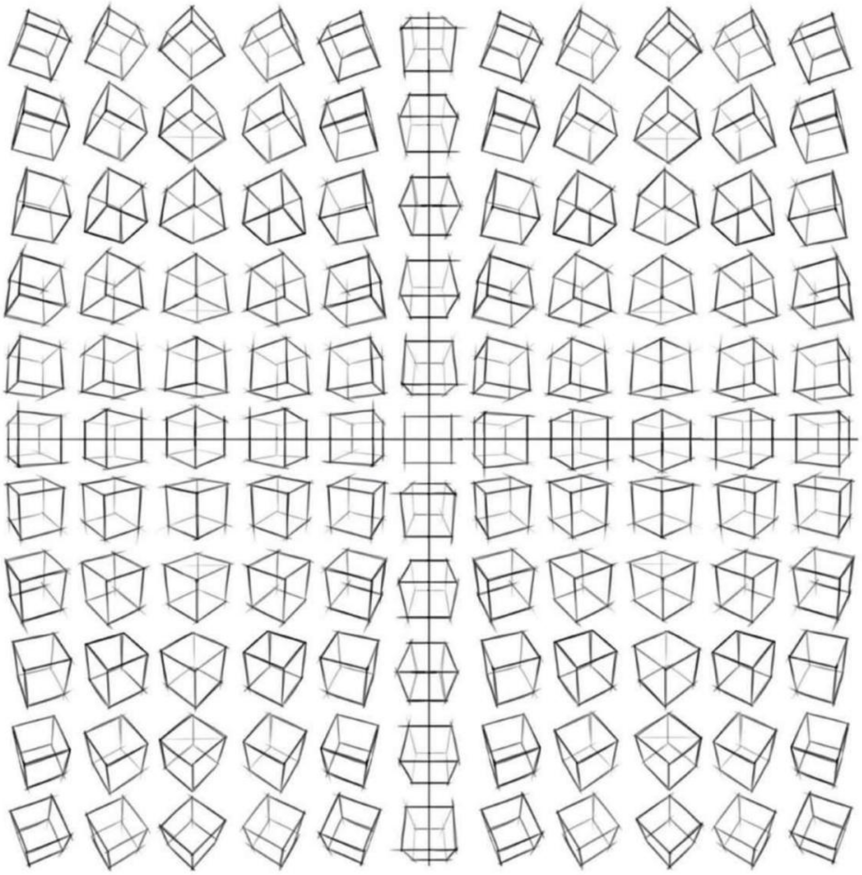
Check if the proportions of the facial features are correct.





If you have trouble drawing the perspective effect of a cube, you can practice by referring to the image below and drawing each one.

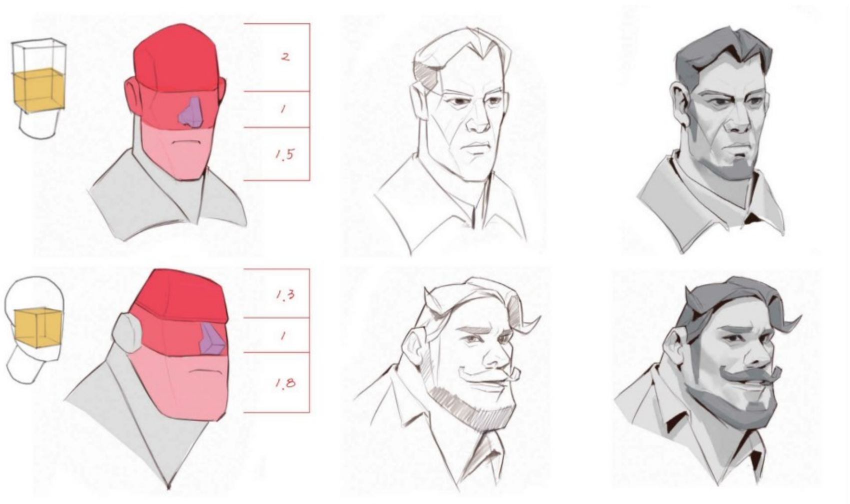
The shape of a cube when it is rotated by 15°.



• Limitations of the "Three Courts and Five Eyes" Approach

It's important to understand that the concept of "three courts and five eyes" doesn't apply to all forms of painting. In actual painting, the human head we depict isn't necessarily realistic; the proportions of the facial features may be adjusted to suit the character's

personality. Let's observe the changes in the "three courts and five eyes" and perspective of facial features in several exaggerated cartoon-style portraits shown below. Generally speaking, apart from realistic heads, other styles of heads require redesigning their proportions to make the style of the artwork more distinctive.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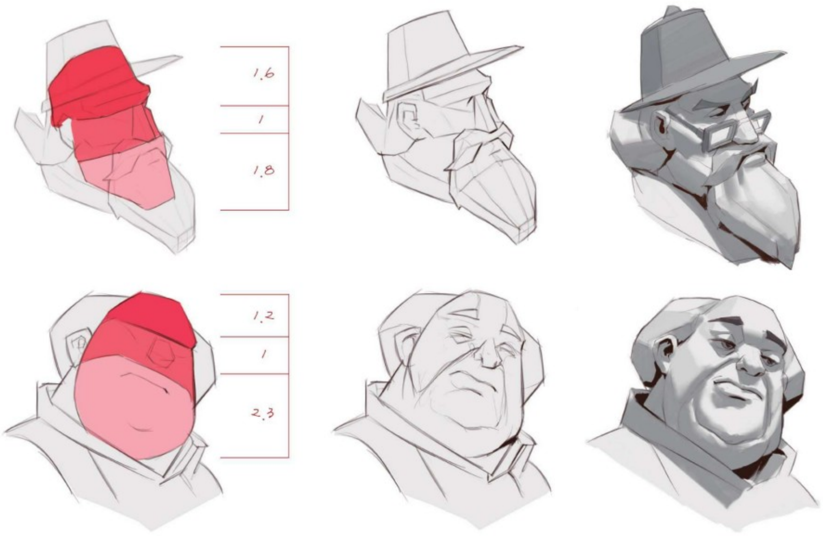
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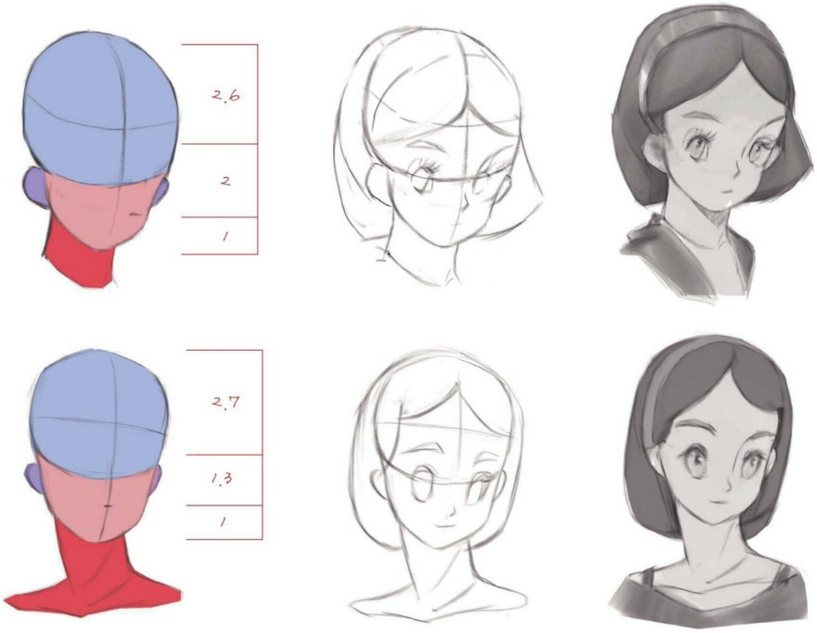
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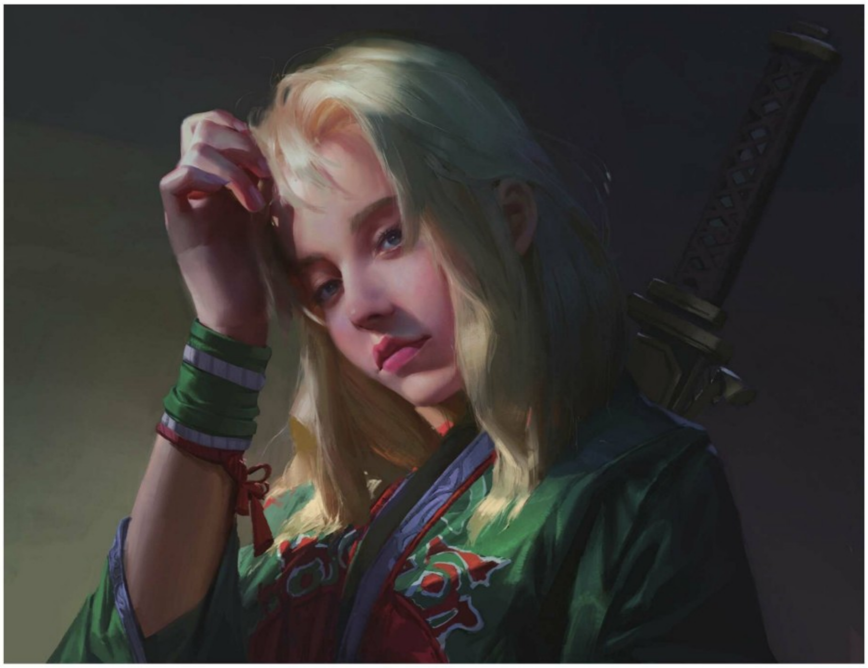


1.2 Overall Head Shape

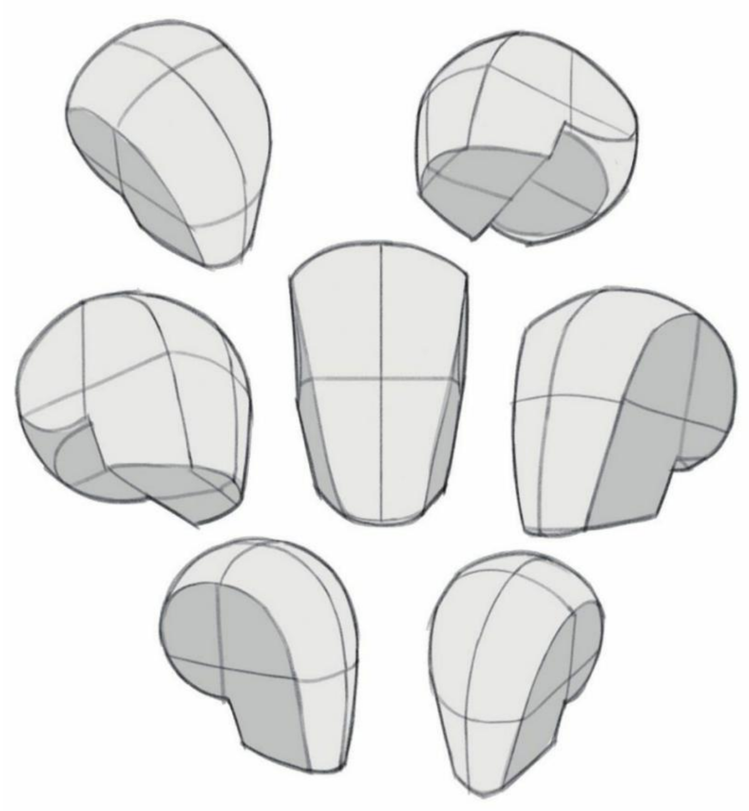
To draw a good head, you need to have a deep understanding of its structure. The features of the head are sculpted by changing the proportions of its structure.

1.2.1 Geometric Analysis of the Head

In actual drawing, one can start by analyzing the head using simple geometric shapes in order to gain a deeper understanding.

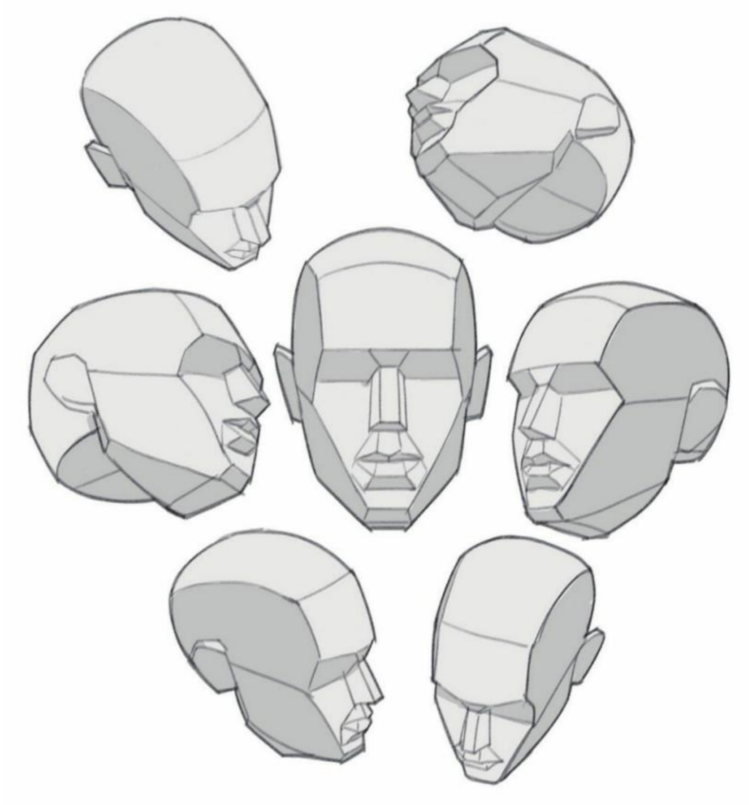
Deconstructing the head

structure. The basic structure of the head resembles a whistle.



By adding cubes representing facial features to the whistle, a relatively complex geometric shape is obtained.

The head, so that the orientation of each block can be determined when drawing light and shadow.

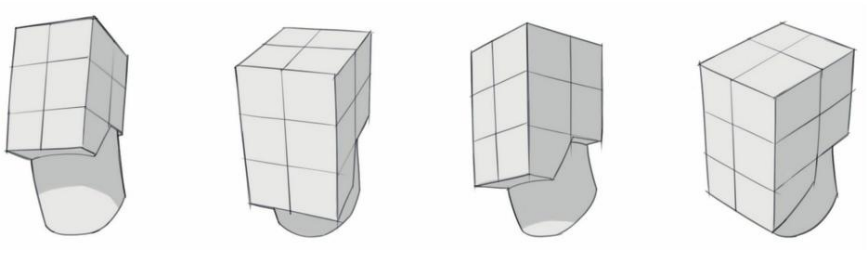


hint

When memorizing the structure of the head, you can incorporate the concept of "hierarchy." During practice, start with simple structural hierarchies and gradually draw more complex ones. Note that you should memorize the deductive process rather than directly copying complex structural hierarchies.

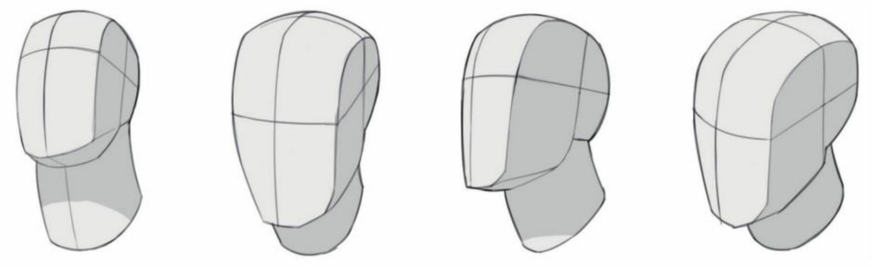
The process for representing the head structure is as follows.

01 When drawing a human head, you can think of the entire head and neck as a combination of cubes and cylinders, and pay attention to the combination and interweaving relationship between the blocks.

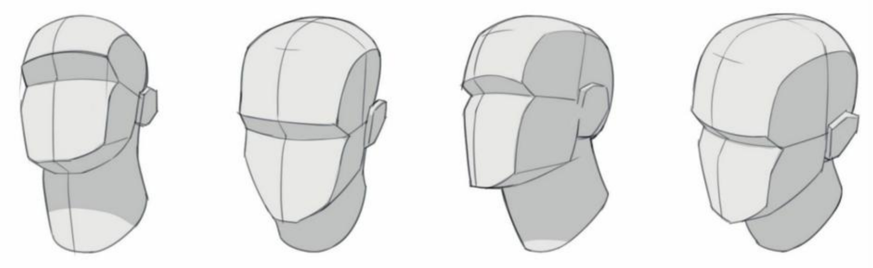


02. Based on the cube drawn in the previous step, cut out the shape of a whistle, paying attention to the curvature of the face.

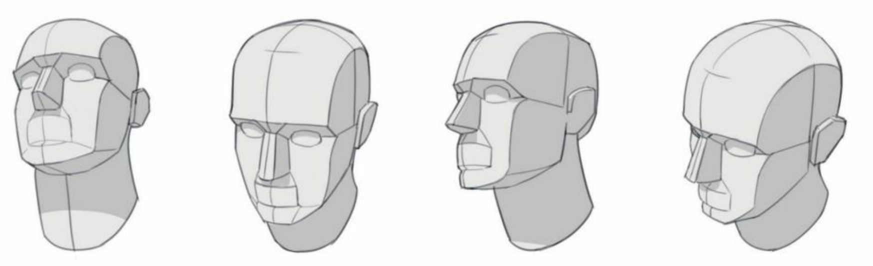
The effect of changes on perspective lines.



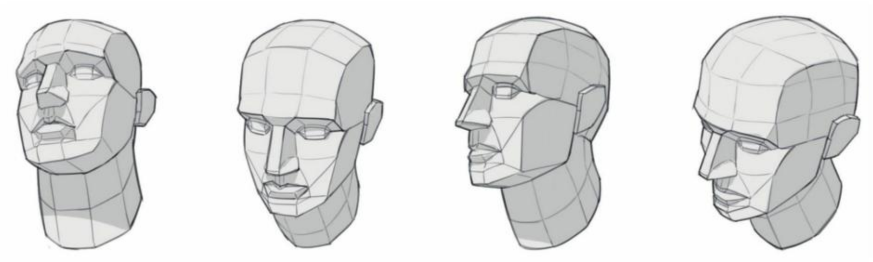
03 Further cut out the forehead and cheeks, then add the ears.



04 Draw a block to represent the nose, insert the eyes as spheres into the eye sockets, and use a cylinder to represent the mouth.



05. Further divide it into more facets, such as the eye being divided into the upper eyelid and lower eyelid, and the mouth being divided into the upper lip and lower lip.



hint

Understanding and recognizing cubic perspective helps in shaping heads from various angles.

Pay attention to the perspective of the cube; don't draw it incorrectly.

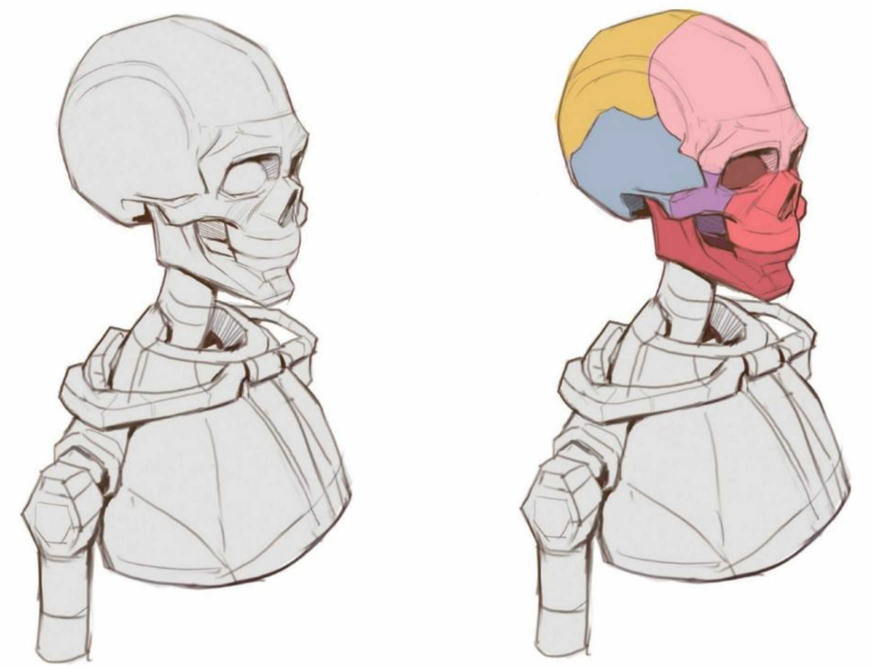
1.2.2 Influence of head bones and muscles on body surface appearance

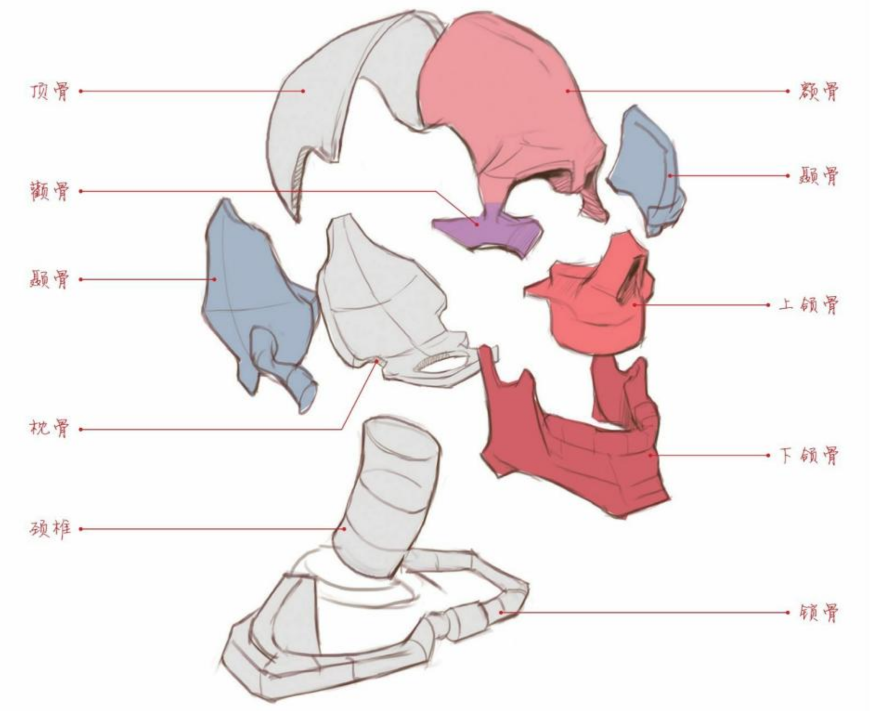
Mastering the geometric shape of the head allows you to solve fundamental problems related to perspective, space, and angles.

Understanding the skull structure allows for the depiction of facial details. The skull consists of the

parietal bone, frontal bone, zygomatic bone, temporal bone, maxilla, mandible, and occipital bone.

become.

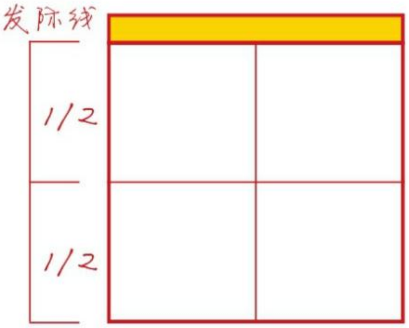


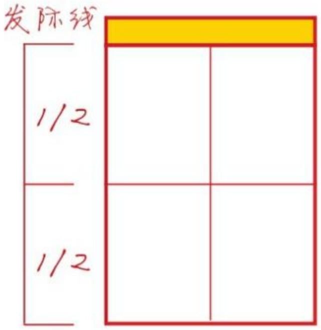

顶骨
颧骨
颞骨
枕骨
颈椎
额骨
颞骨
上颌骨
下颌骨
锁骨

Next, combining the concept of "three courts and five eyes," we will draw a frontal and side view of the skull.

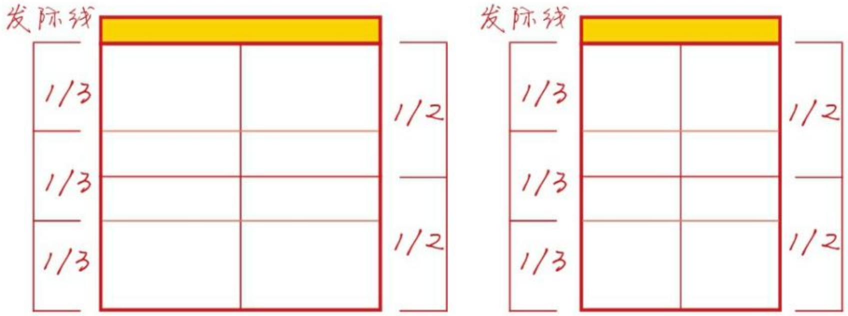
Learn about and become familiar with the human skull.

01 Determine the overall proportions of the skull from the side and front (the yellow area is the area from the hairline to the skull).

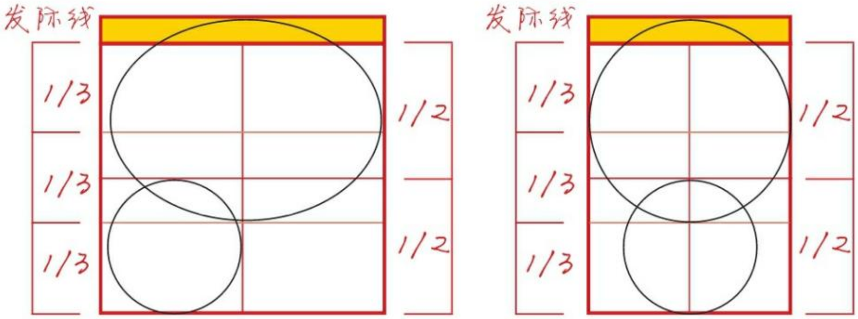




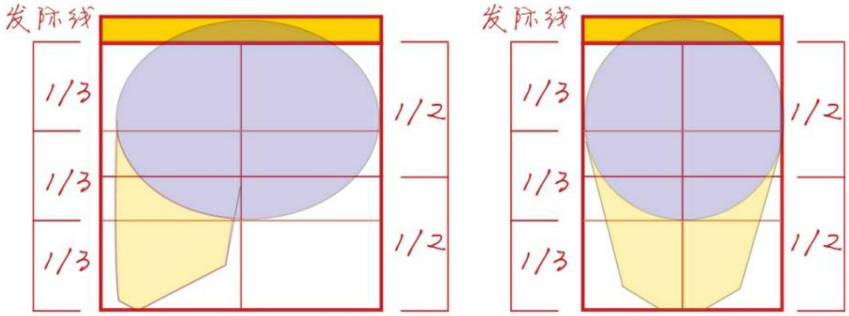
02. Determine the positions of the "three courts and five eyes" in the square.


发际线
1/3
1/3
1/3
1/2
1/2
发际线
1/3
1/3
1/3
1/2
1/2

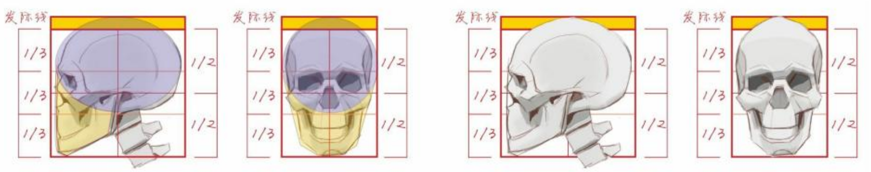
03 Draw the general shape of the skull within the square.


发际线
1/3
1/3
1/3
1/2
1/2
发际线
1/3
1/3
1/3
1/2
1/2

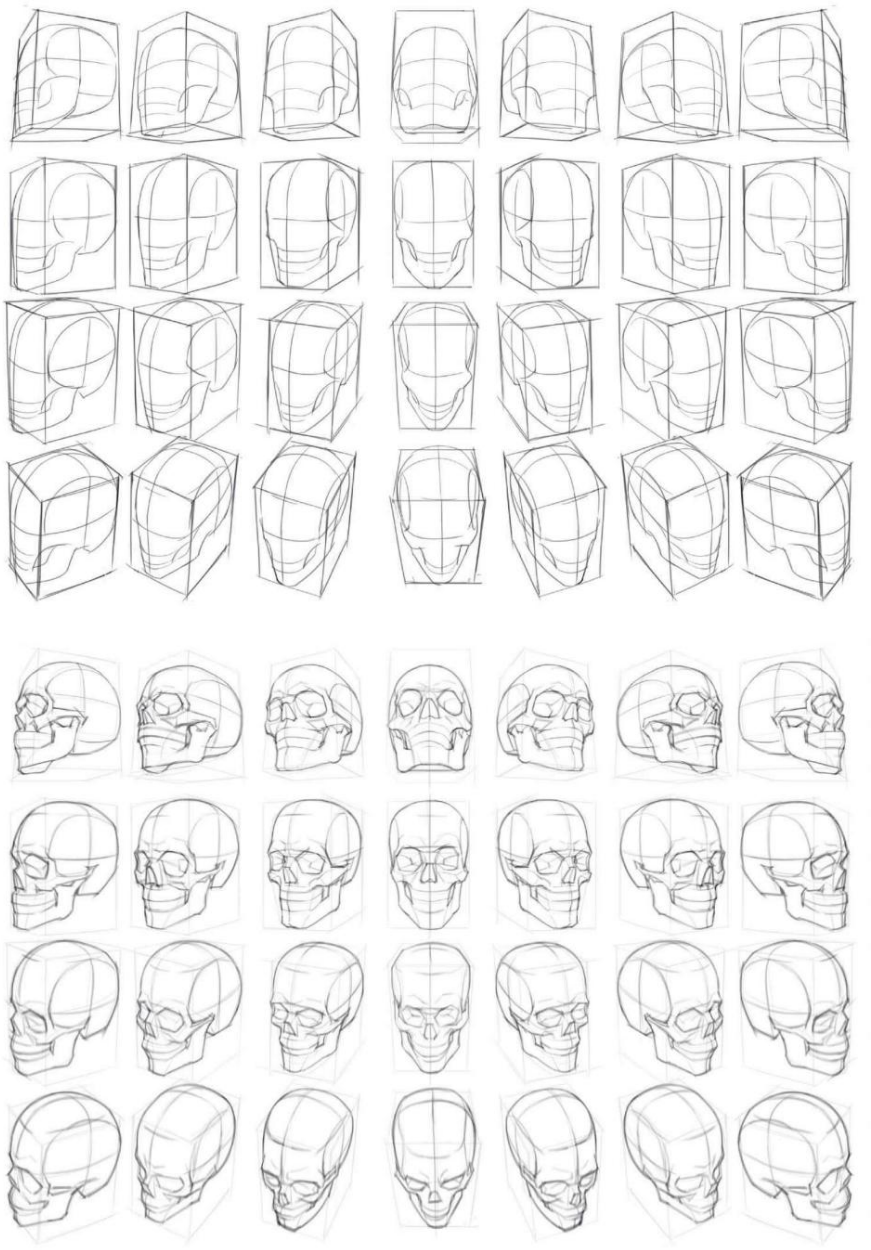
04. Refine the structure of the skull based on its shape.


发际线
1/3
1/3
1/3
1/2
1/2
发际线
1/3
1/3
1/3
1/2
1/2

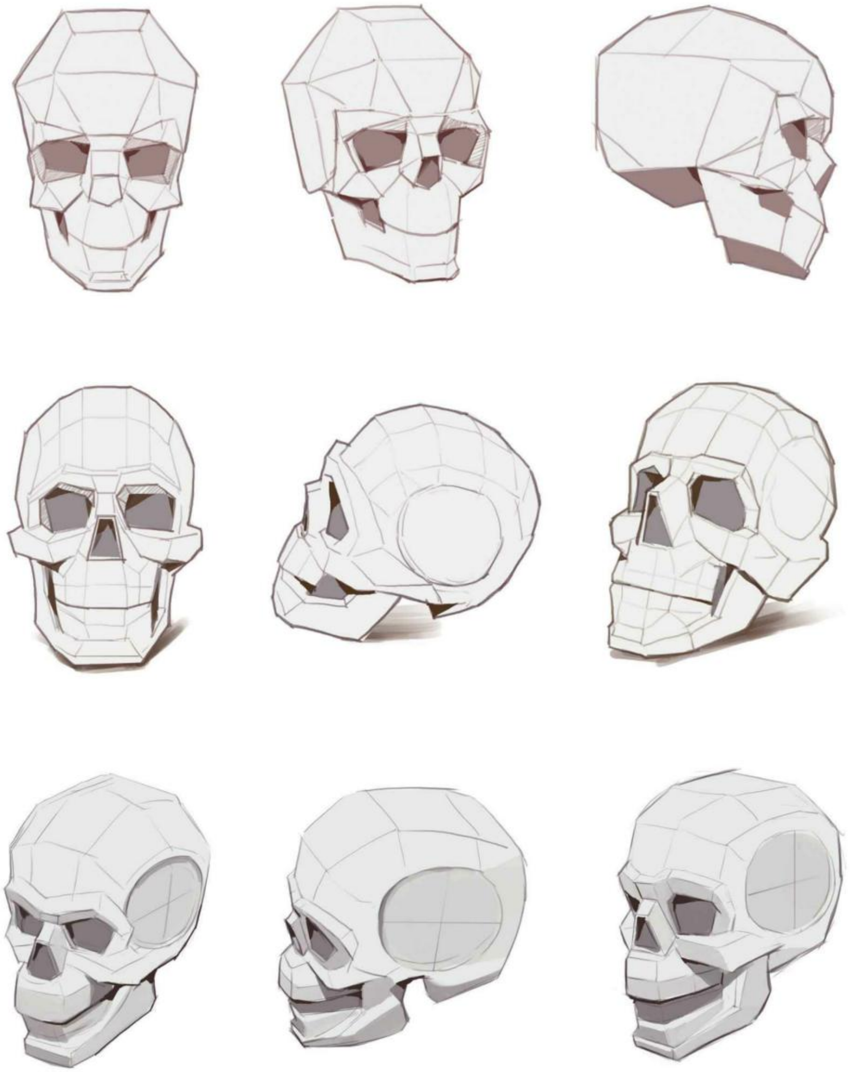
05. Obtain a skull with the correct proportions.


发际线
1/3
1/3
1/3
1/2
1/2

The following shows the skull from different angles.

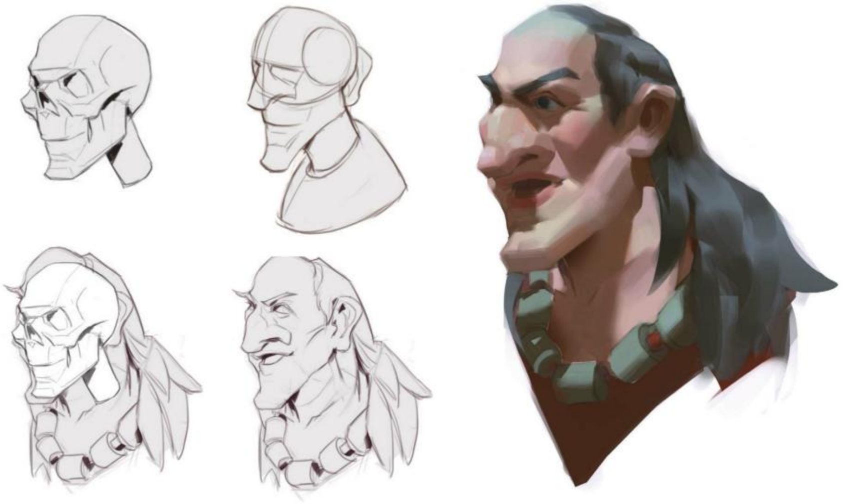


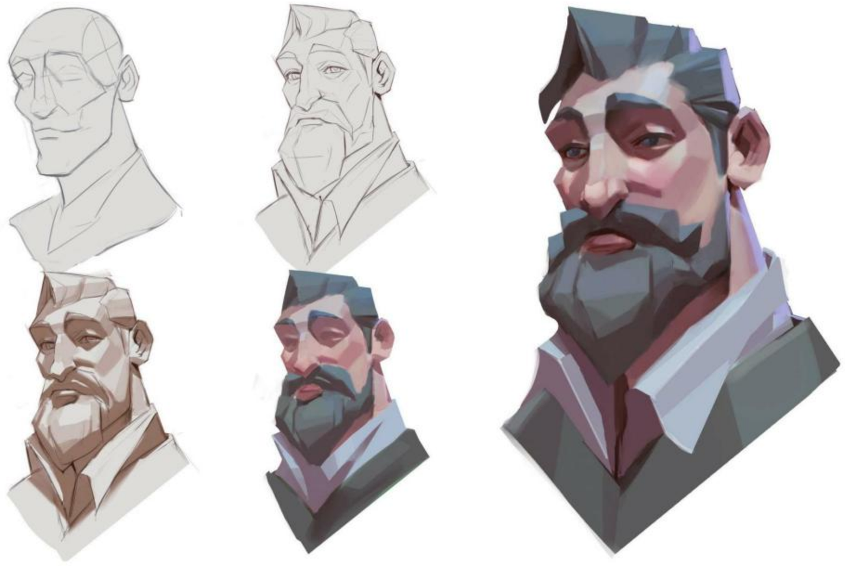
Summarizing the skull from different angles into planes helps to understand the different morphological changes of the head in space.



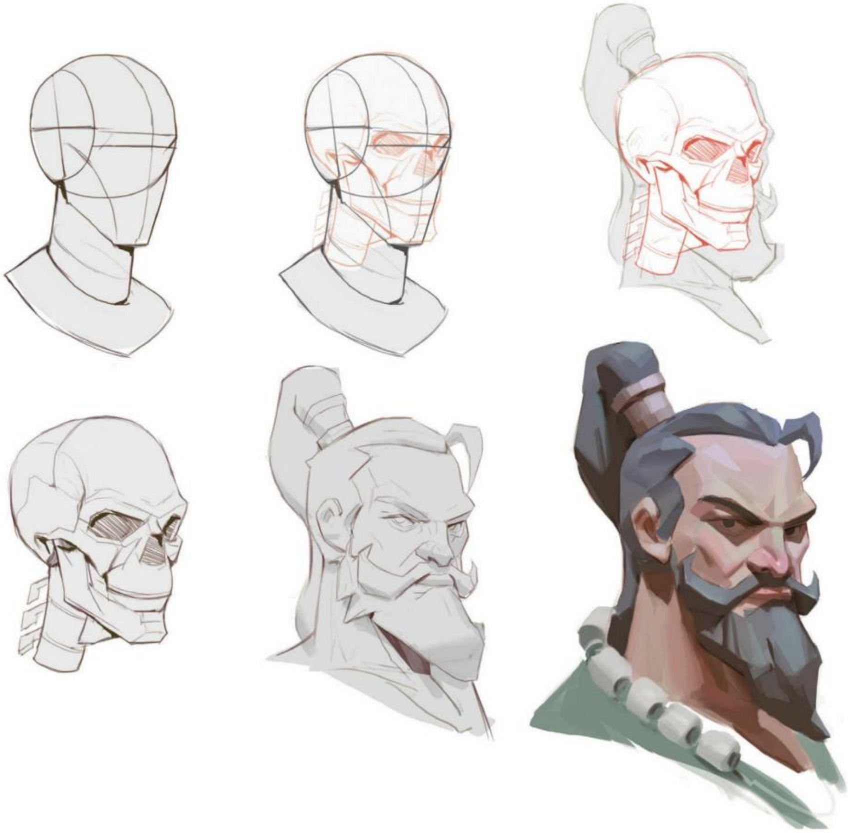
• The influence of the skull on facial features

The shape of the skull directly affects a person's appearance. After mastering the basic shape of the skull, one can boldly exaggerate and deform it, thereby creating more interesting anime characters.

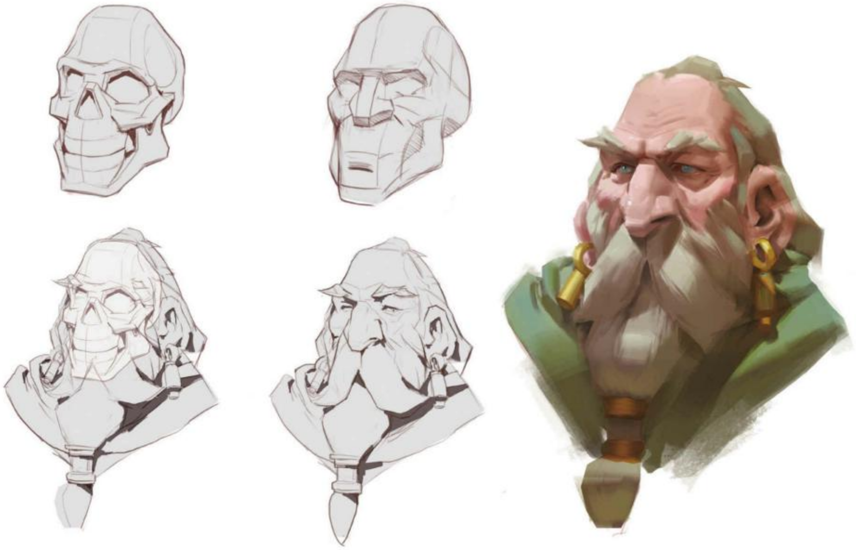




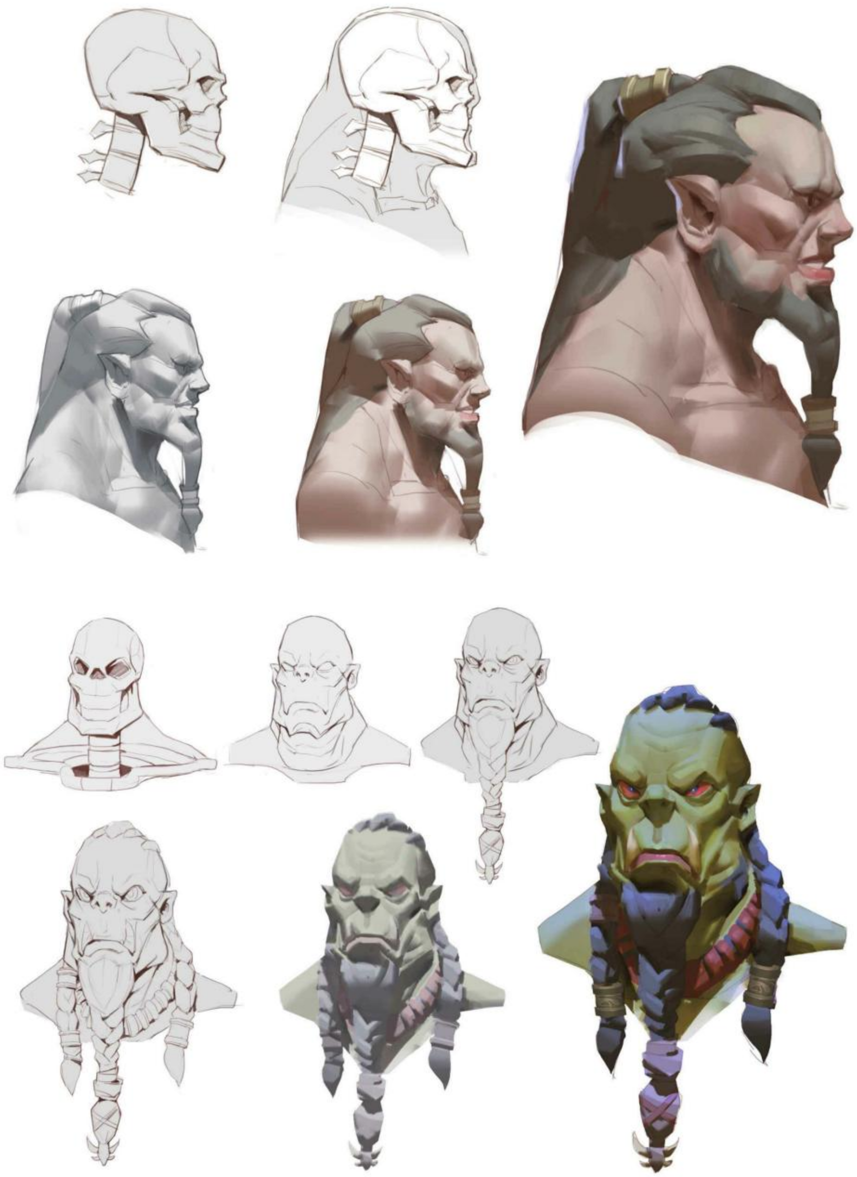
ordinary human head



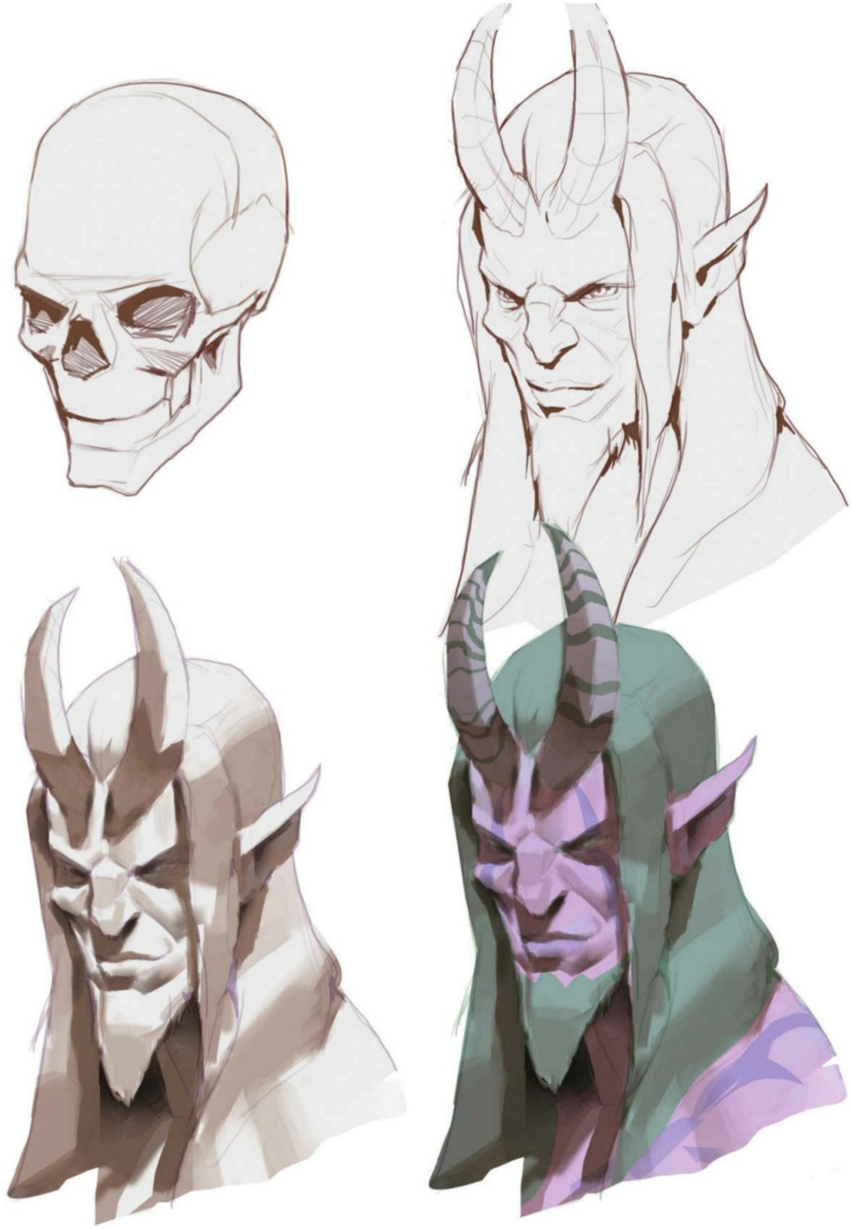
Dwarf Head

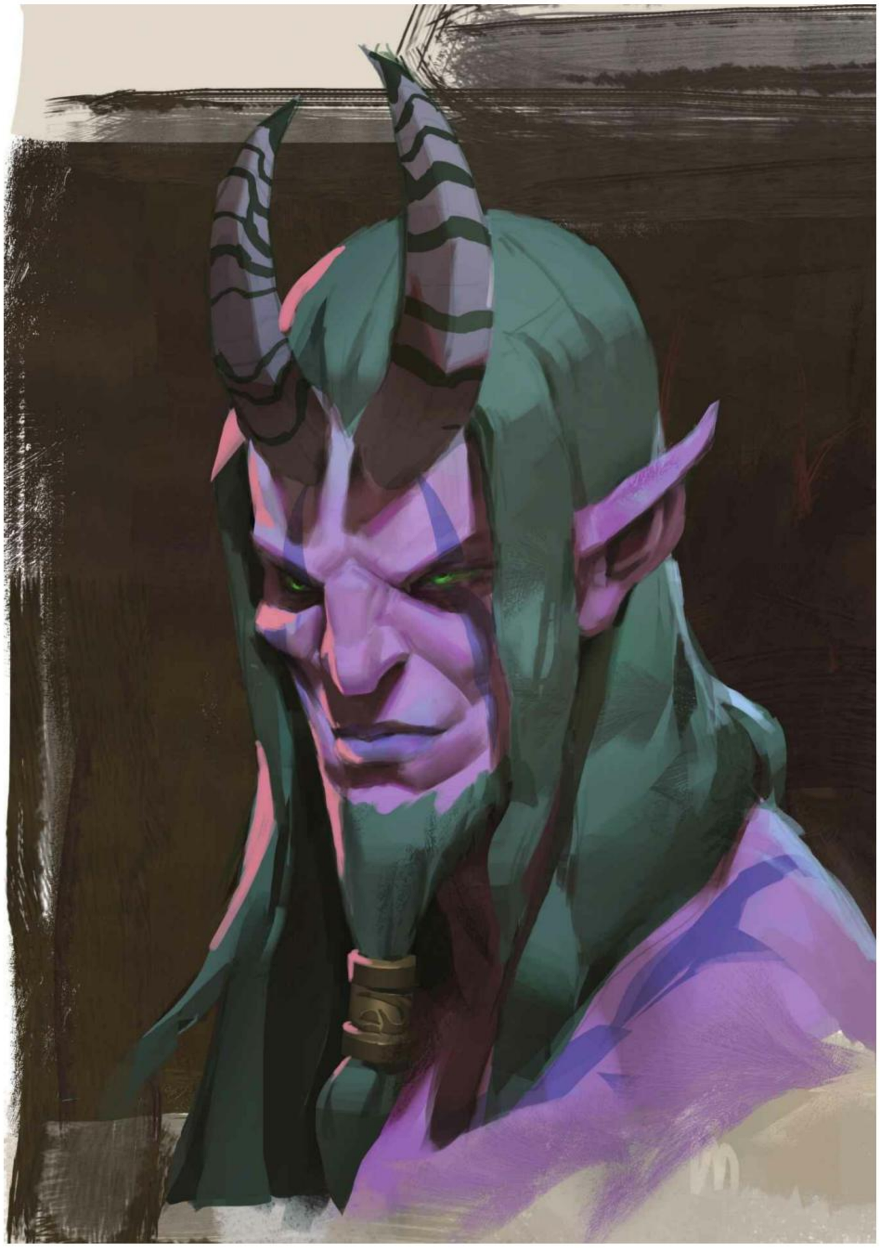


Orc head

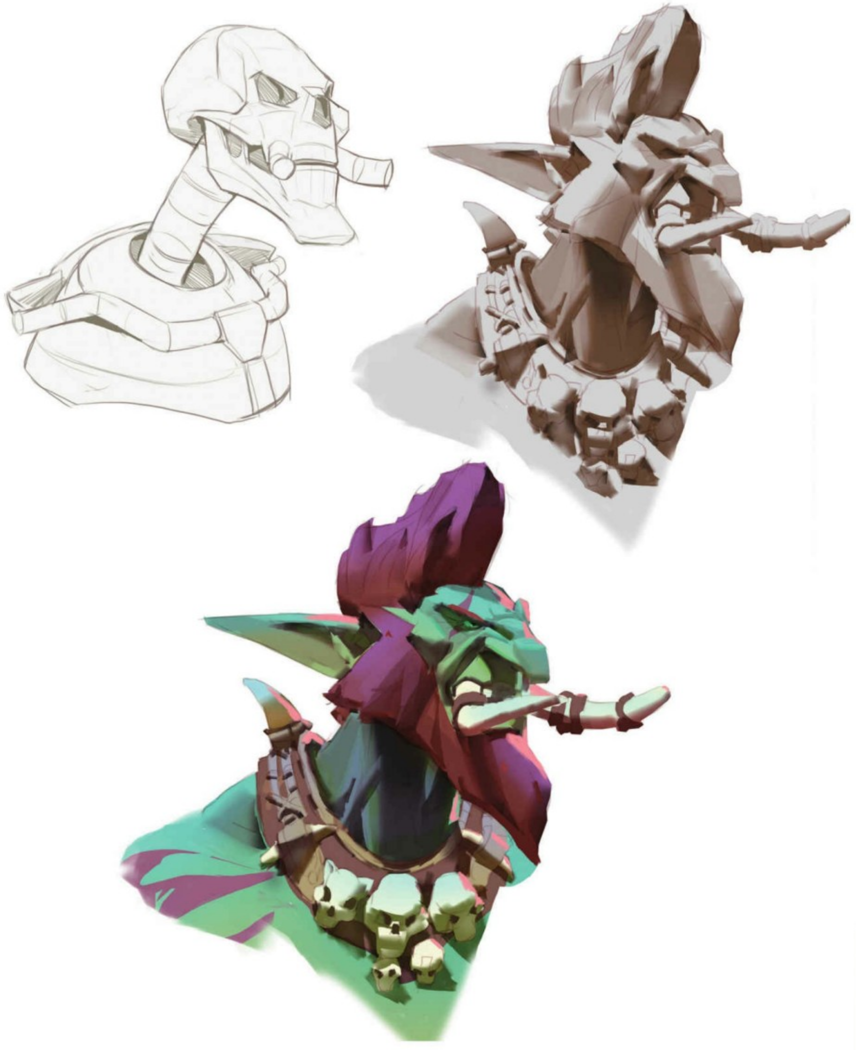


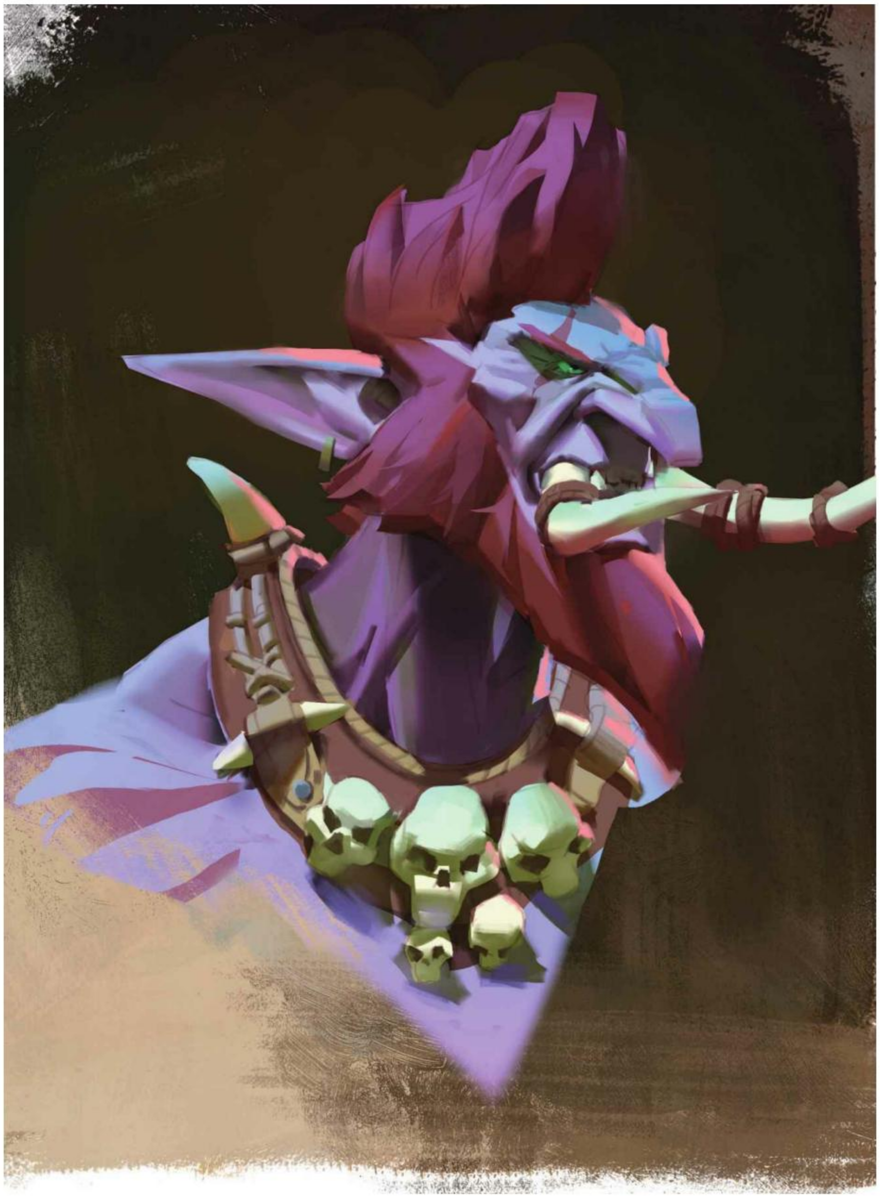
Night Elf Head



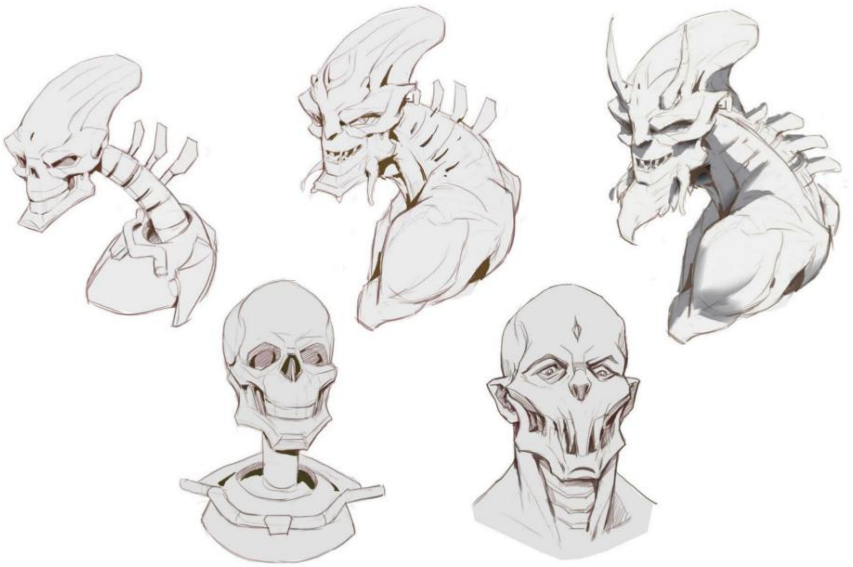


Troll Head

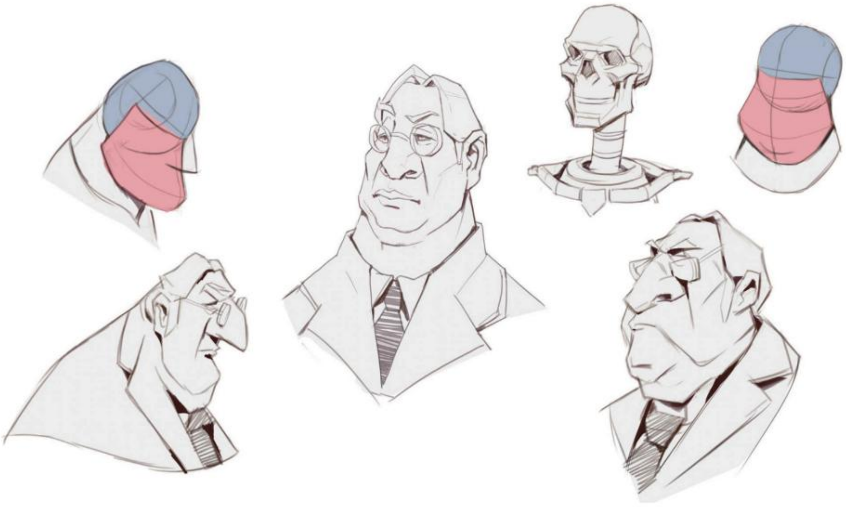




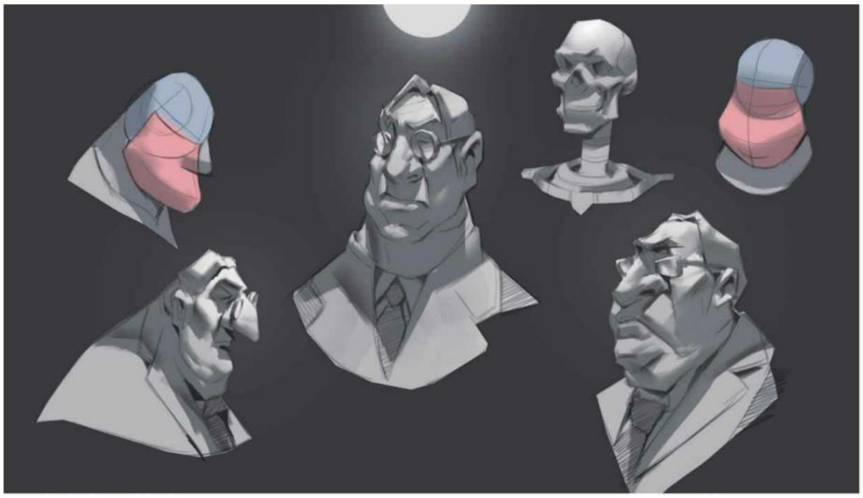
Dark-type undead head

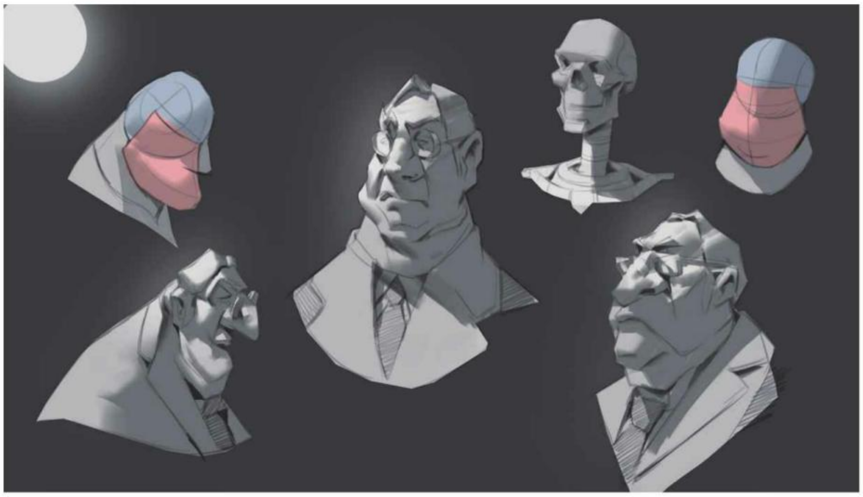


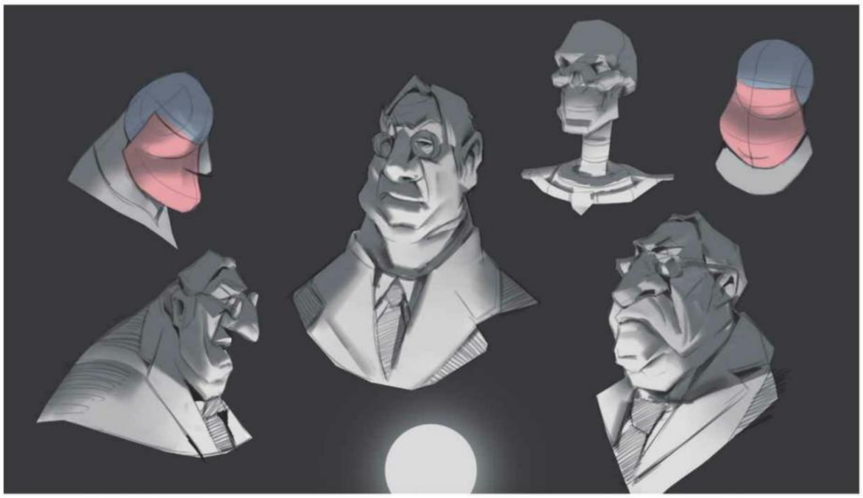
Starting with the skull and then summarizing the shapes of the head, one can draw relatively realistic and complex images. Understanding the structure as blocks helps in calculating the intensity of light on surfaces based on the orientation of these blocks when depicting light and shadow, resulting in a more consistent light and shadow effect.



Once you've drawn the line art, try analyzing it using light sources from different directions. This will help you better understand and master the head structure.



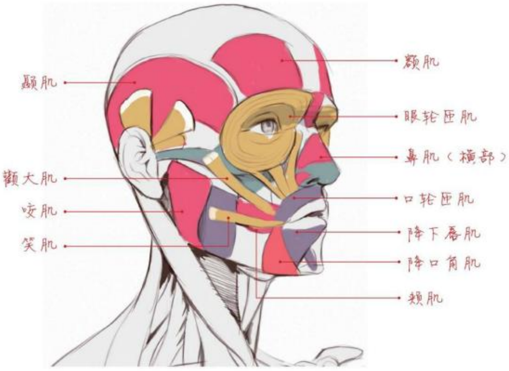




- ## Head muscles

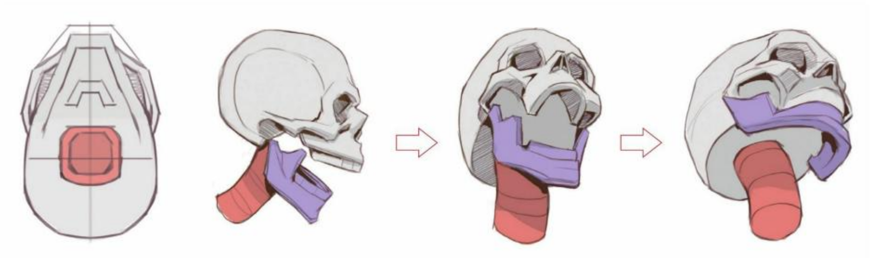
The muscles in the head are quite complex; when memorizing them, focus on the masseter, orbicularis oris, and orbicularis oculi muscles.

These muscles affect the body's surface contours.

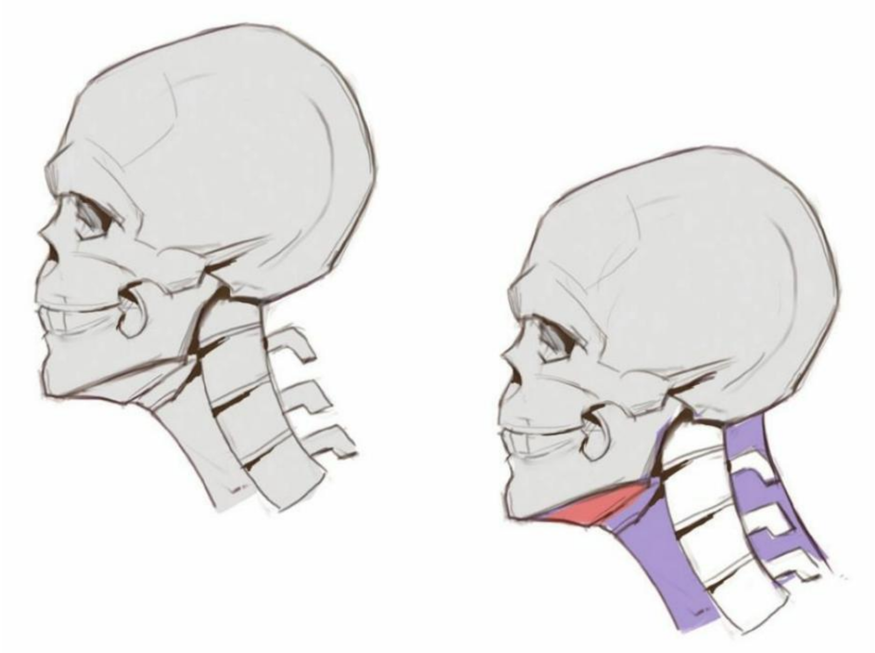


1.2.3 Connection between the head and neck

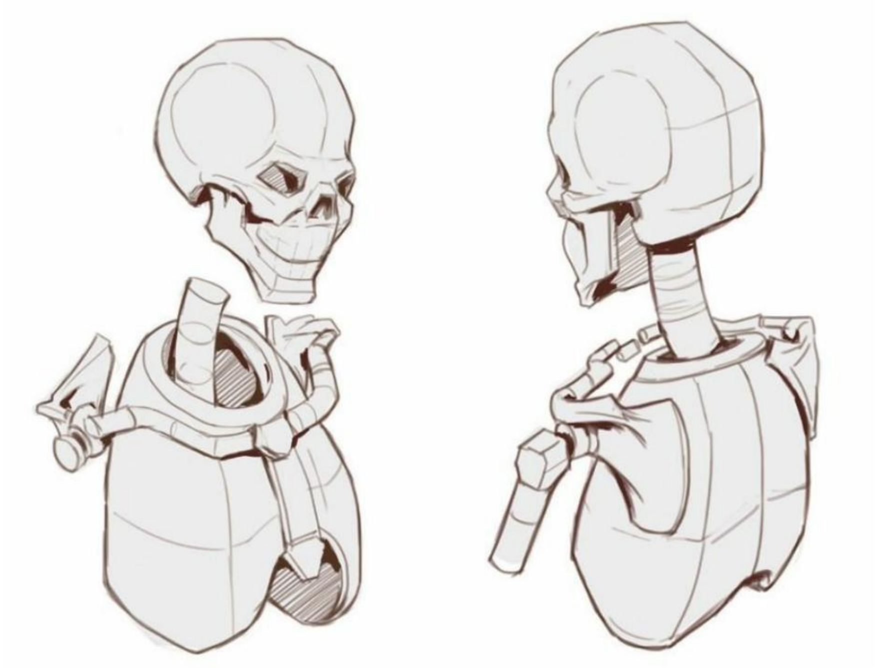
When depicting the connection between the head and neck, attention should be paid to the joint between the neck and the skull. The shape of the cross-section, and the connection structure between the mandibular base and neck. The connection between the head and spine is shown below.



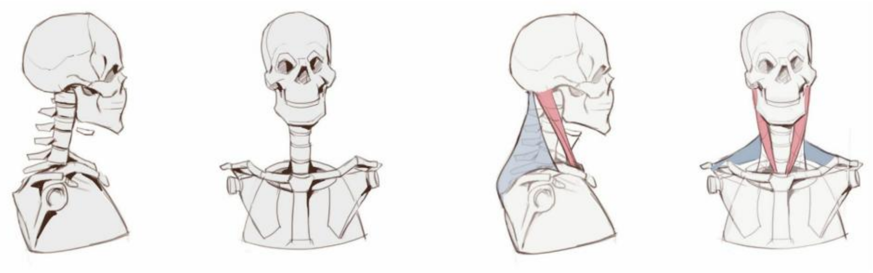
The red triangular area shown below is formed where the bottom of the jaw connects to the neck.



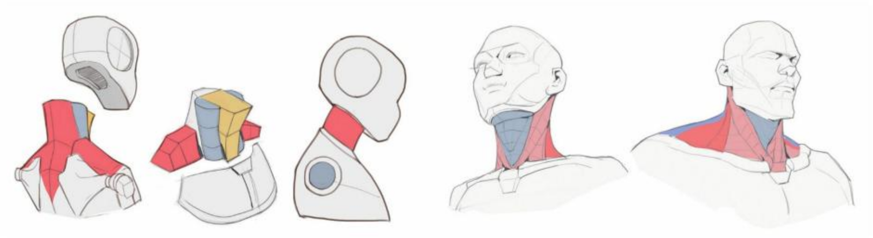
The overall connection between the head and torso is shown below.



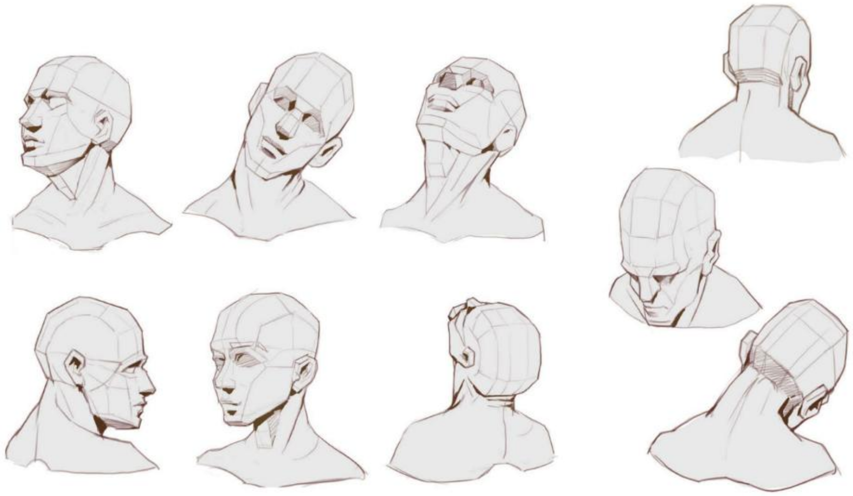
The connection between bones and muscles is shown below.



The connection between the head and neck can be understood from the perspective of volumetric simplification as follows.



The relationship between head, neck, and shoulder twisting is as follows.

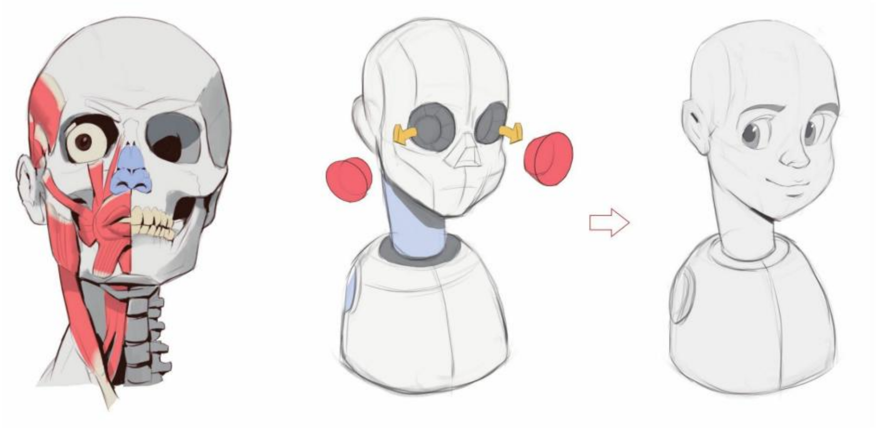


1.3 Facial features and expressions

Animated films feature many characters whose appearances are exaggerated, but are all based on reality. Based on the structure of a person, it is important to learn about facial features and expressions.

1.3.1 Eyes

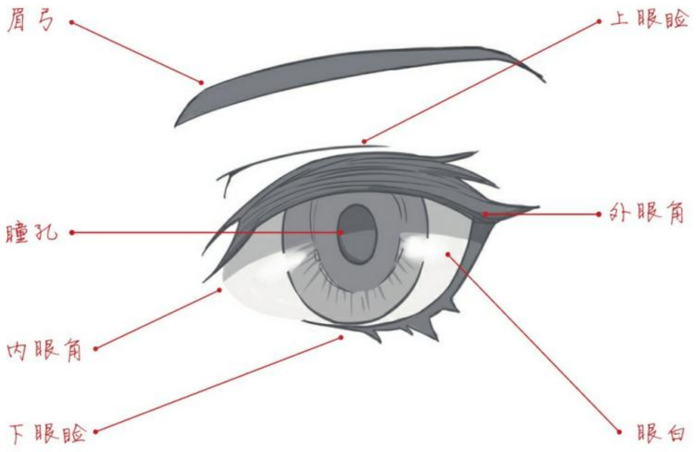
The eyes are one of the most important organs in the human body, and a part that needs to be emphasized in drawing. To draw eyes well, one must have a certain understanding of their structure.



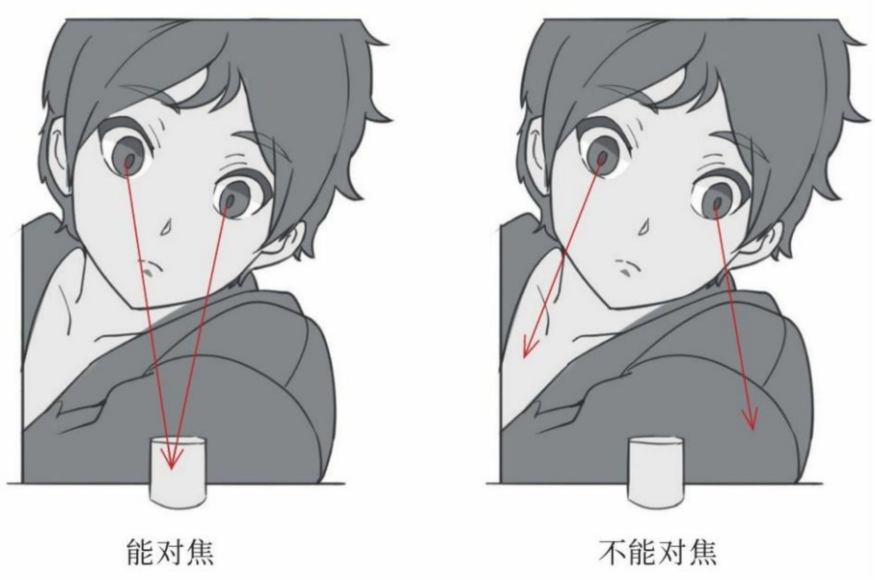
- Structure of the eye

Let's first understand the basic structure of the eye. The eye is a sphere, and when drawing it, you need to consider the relationship between the eye and the surrounding bones. The structure of the eye, as discussed, includes the undulations and changes in the eye and the surrounding orbit.

The eye and surrounding structures consist of the brow ridge, pupil, inner canthus, lower eyelid, sclera, and outer canthus. The upper eyelid is composed of...

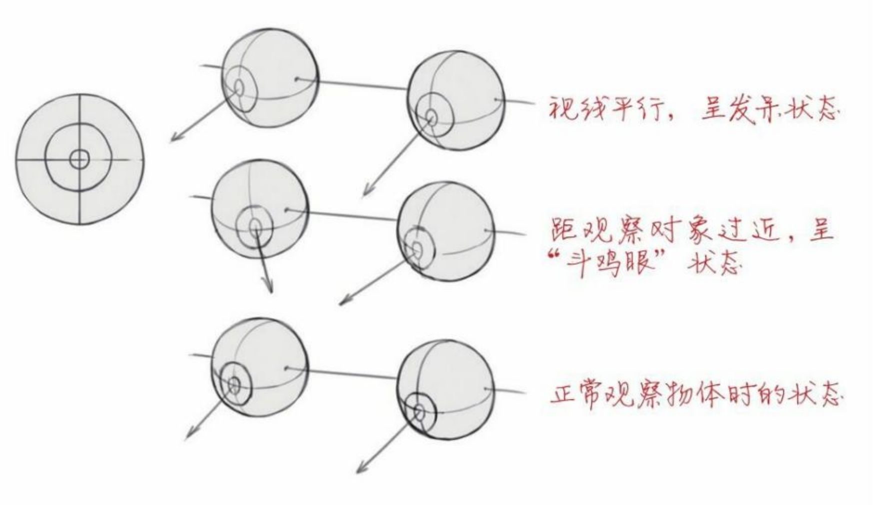


When drawing the structure of the eyes, it's important to understand that the pupils are embedded in the eye sockets; this will allow you to better capture the contours of the eye structure. Also, the movements of both eyeballs are generally synchronized; if the eyes are out of focus, they will appear unfocused and lifeless.

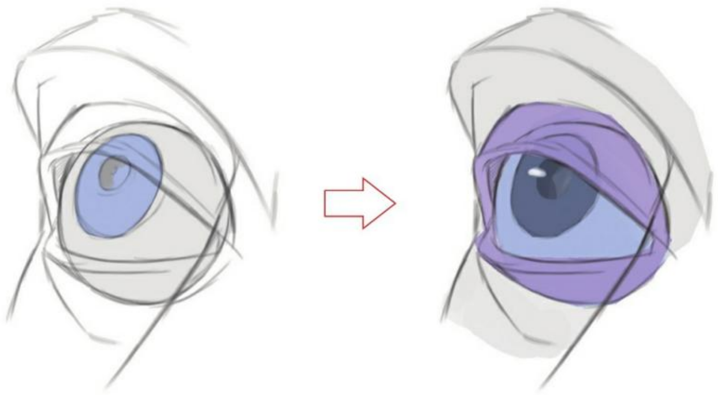


If an object is held too close to a person's eyes, it can easily cause strabismus (crossed eyes). To avoid this, [further measures should be taken].

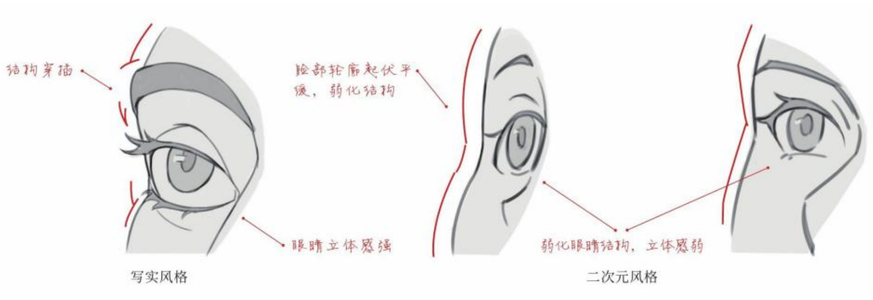
In cases of corns or unfocused eyes, the eyeball should be represented as a rotating sphere.


视线平行，呈发呆状态
距观察对象过近，呈“斗鸡眼”状态
正常观察物体时的状态

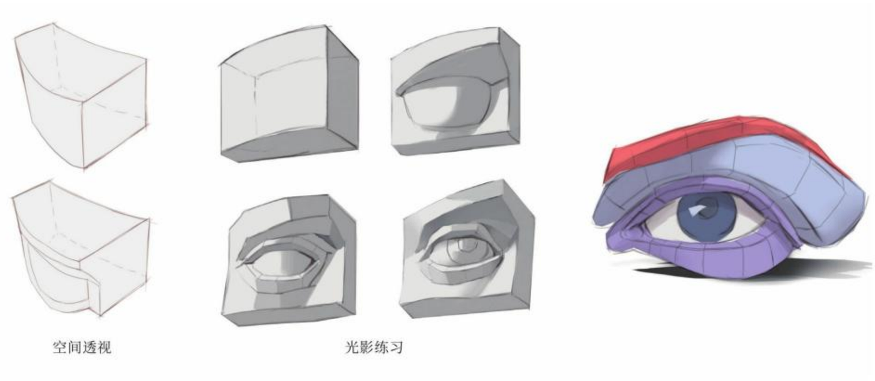
From its appearance, the eyeball is a sphere encased under the eyelid, so when we look at a person's eyes, we usually can't see the entire eyeball, but only a part of it, and the part of the eyeball we see is almond-shaped.



In addition, highlighting the eye structure can make the image look more realistic, while downplaying the eye structure can make the image look more like anime.

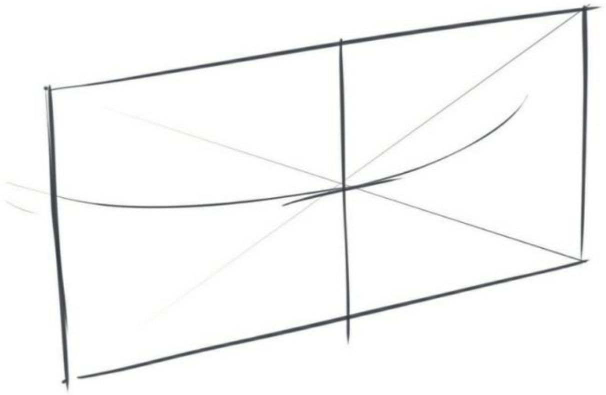

结构穿插
脸部轮廓起伏平缓，弱化结构
眼睛立体感强
弱化眼睛结构，立体感弱
写实风格
二次元风格

To draw the structure of an eye, you can start with basic geometric shapes, then gradually refine the block structure, and finally draw the complex eye structure.

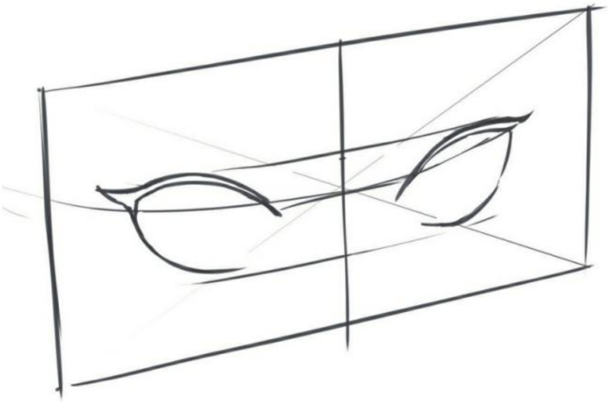


Next, let's learn about the spatial perspective structure of the eye. Since the left and right eyes are on the same perspective horizontal line, when representing the spatial perspective structure of the eye, we can place the eye within a rectangular perspective frame and then show the perspective changes of the eye from various angles. The drawing process is as follows.

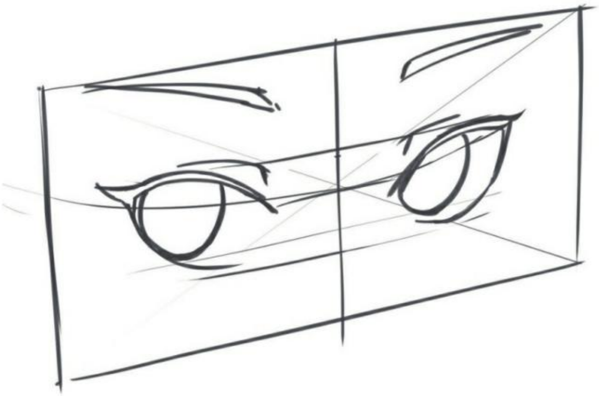
01 First, draw a perspective plane, draw the dividing line in the middle, and then draw an arc to indicate the direction the face is facing.



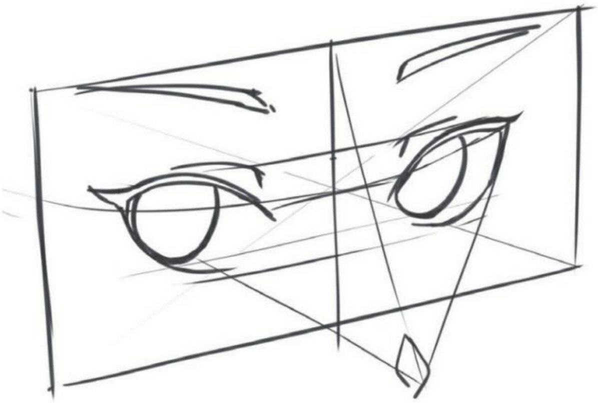
02 Determine the outer contours of the two eyes based on the perspective of the surfaces. The eyes should fit the arc representing the direction of the face.



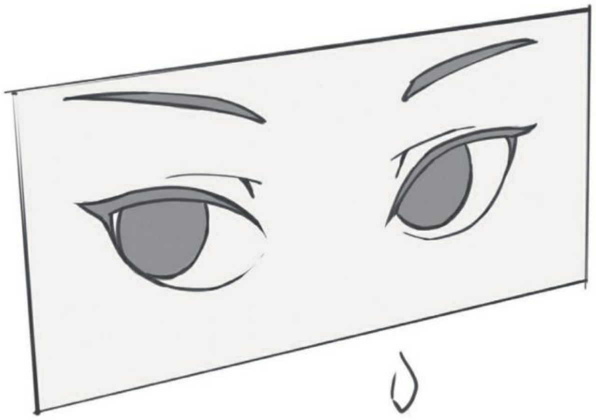
03 Draw the pupils. Due to the perspective, the pupils are no longer round, but slightly flattened. Then draw the eyebrows on the left and right sides according to the perspective.



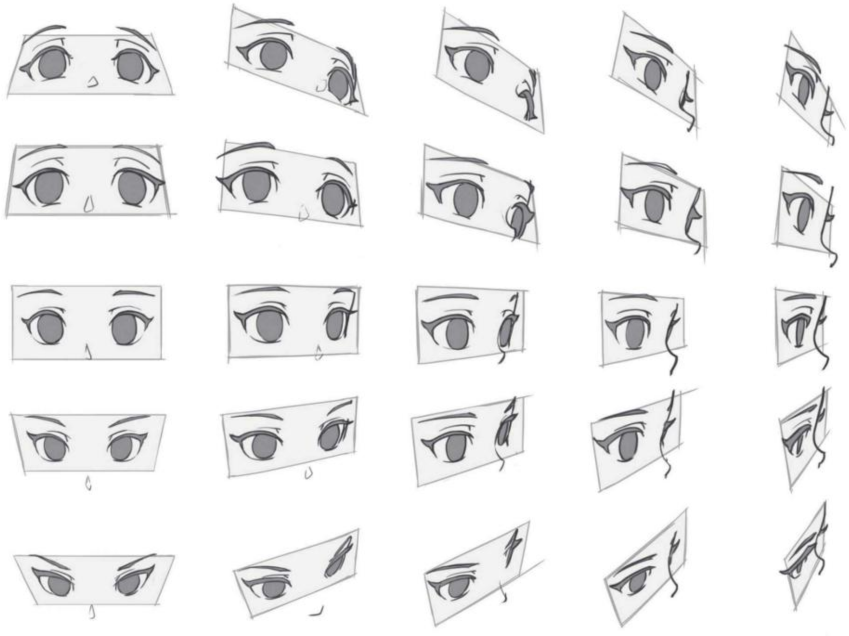
04 Draw a triangle based on the width of the eyes to determine the position of the nose (suitable for anime-style drawing).



05. The structure of the eye is further expressed through a simple black, white and gray relationship.



Once you've learned how to draw eyes with perspective using the method described above, you can practice drawing eyes from various perspective angles.

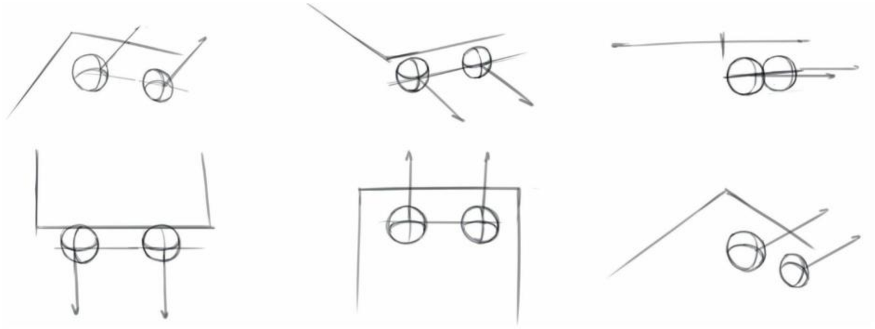


• Drawing process of eyes and surrounding structures

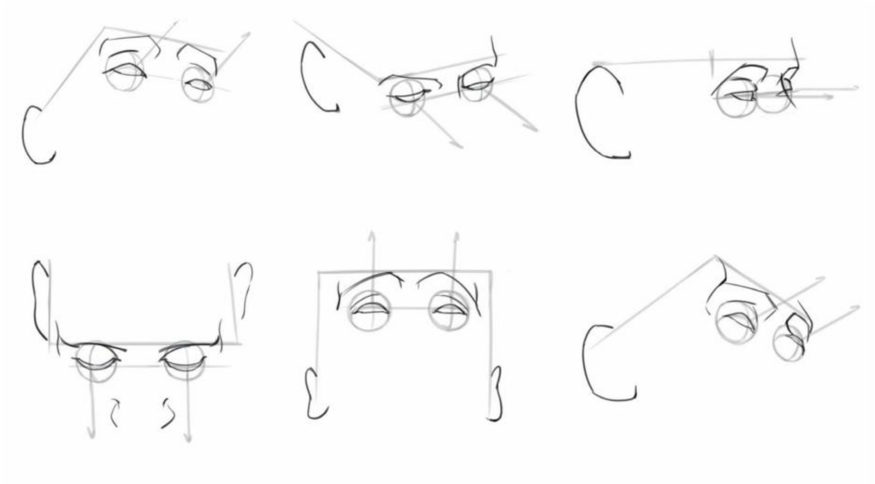
When drawing eyes, pay attention to their position on the head and perspective. The drawing process for the eyes and surrounding structures is as follows.

01. Determine the perspective line of the eyes. This step requires a sense of cubes, using the face of the eyes facing forward and the ears as references.

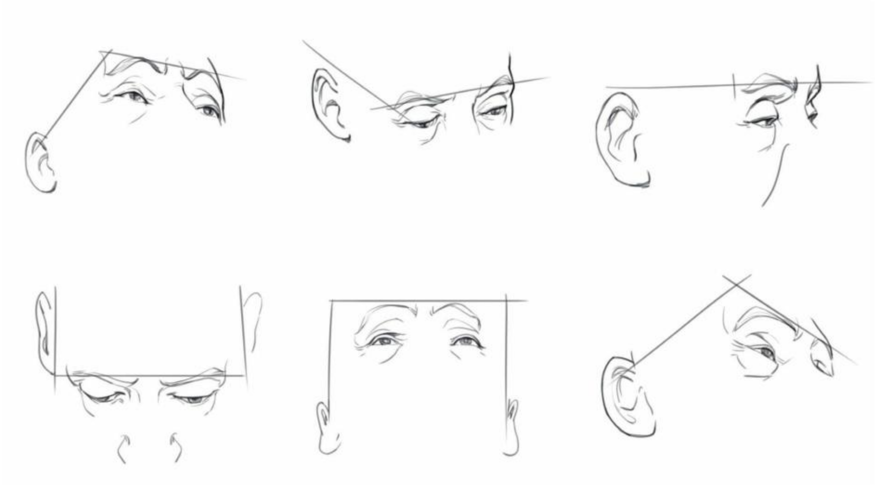
Using the side view as a reference, the eye is represented by a sphere to determine the direction in which the eyeball is looking.



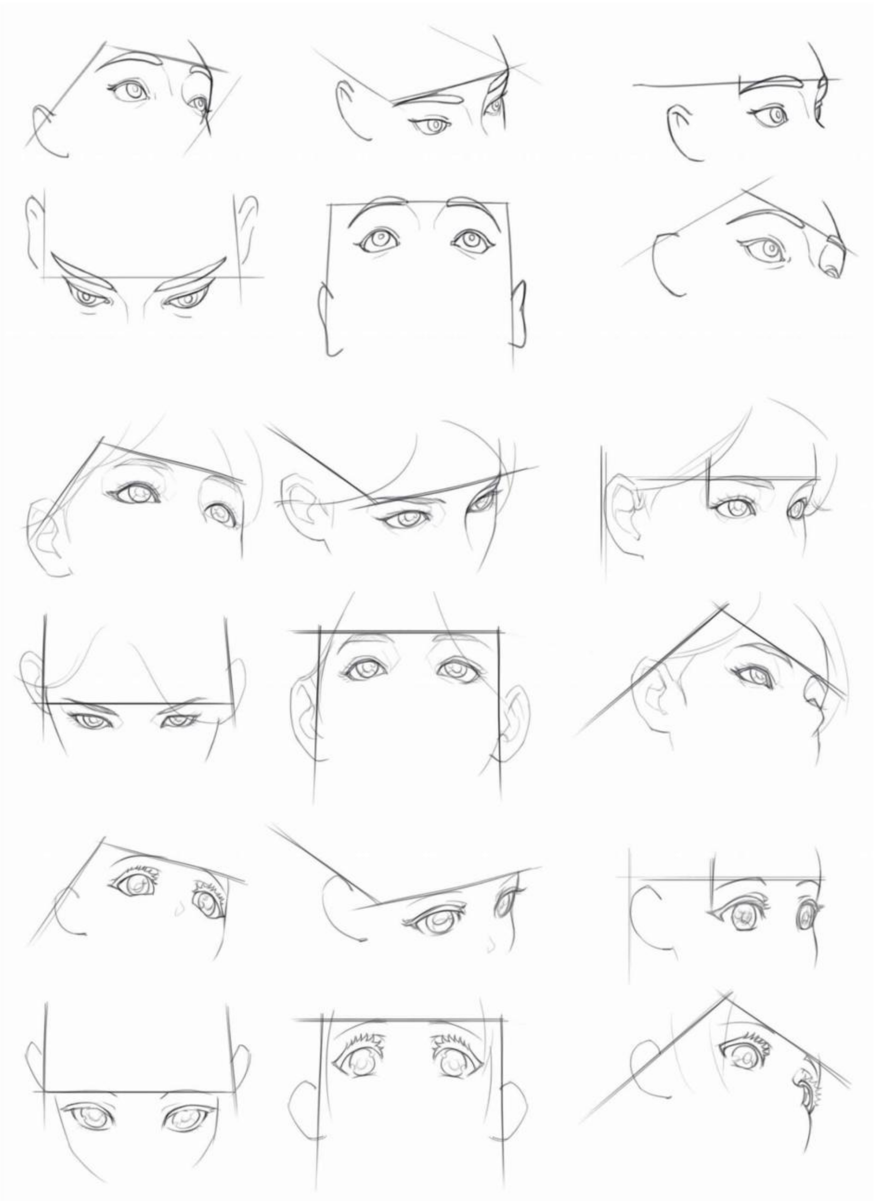
02 Pay attention to the relationship between the brow bone and the pupil, and clearly show the shape of the eyes.



03 Draw the pupils, and depict the wrinkles around the corners of the eyes according to the eye structure.

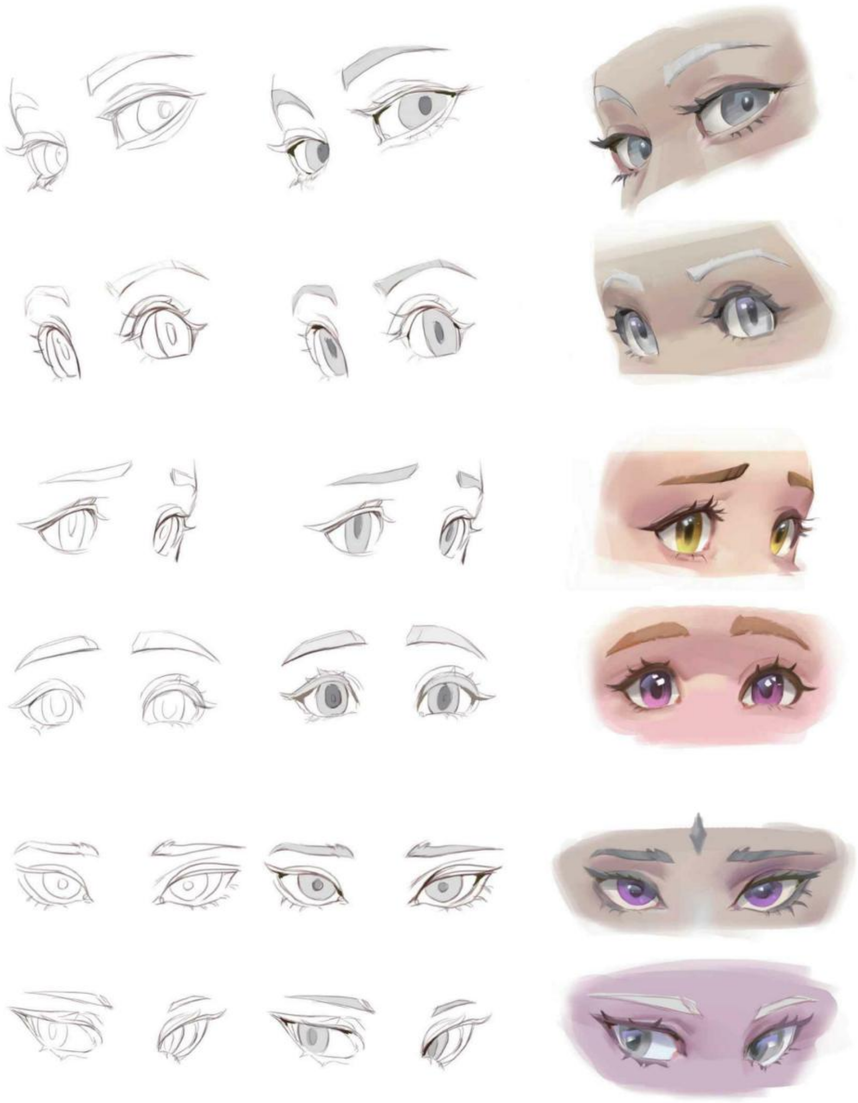


Then, use the same method to draw more forms and styles of eyes.



• Eye expressions in different styles and angles

The eyes best reflect a person's temperament, mainly through changes in the height of the inner and outer corners of the eyes, the shape of the upper and lower eyelids, the length of the eyelashes, and whether they are single or double eyelids. The shape of a person's eyes changes when they make facial expressions.

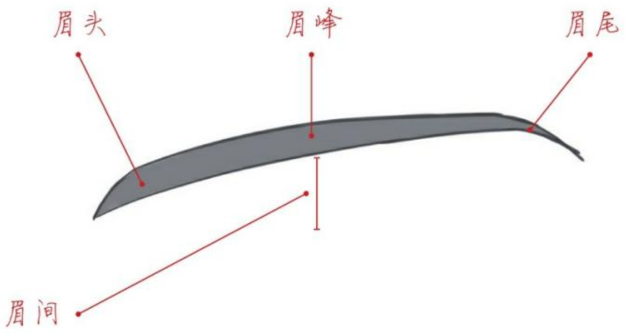


1.3.2 Eyebrows

The shape and position of eyebrows can highlight a person's personality. Emphasizing the depiction of eyebrows can further enhance a person's personality traits.

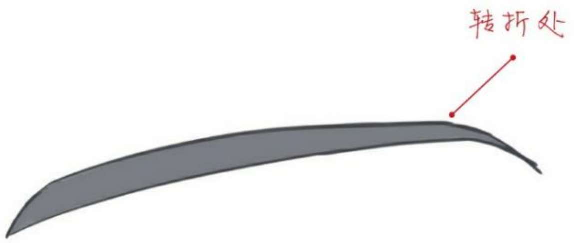
• Structure of eyebrows

The structure of an eyebrow is divided into the space between the eyebrows, the inner corner of the eyebrow, the arch of the eyebrow, and the tail of the eyebrow. The space between the eyebrows refers to the distance between the eyebrow and the eye, which is generally about the width of an index finger.

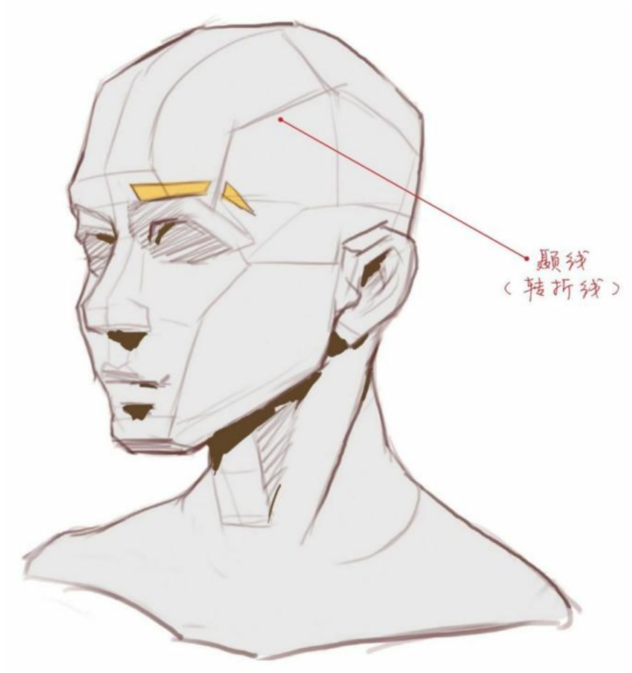


One point to note is that eyebrows, attached to the bone structure, inevitably cross the temporal line, which is the head's...

The turning line on the bone will also turn at the brow peak.



The temporal line extends upwards from the brow bone and is an important turning line between the two planes that divide the forehead and the temple.



The above points also apply when portraying stylized characters.

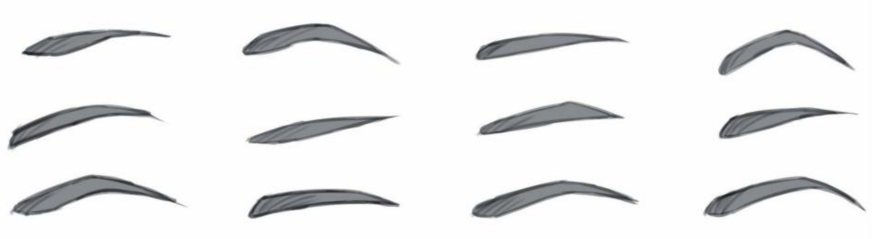
hint

Drawing eyebrows is relatively simple, so we won't go into the details of the process here. For drawing eyebrows, you only need to understand their basic structure and then express different styles and angles of eyebrow shape.

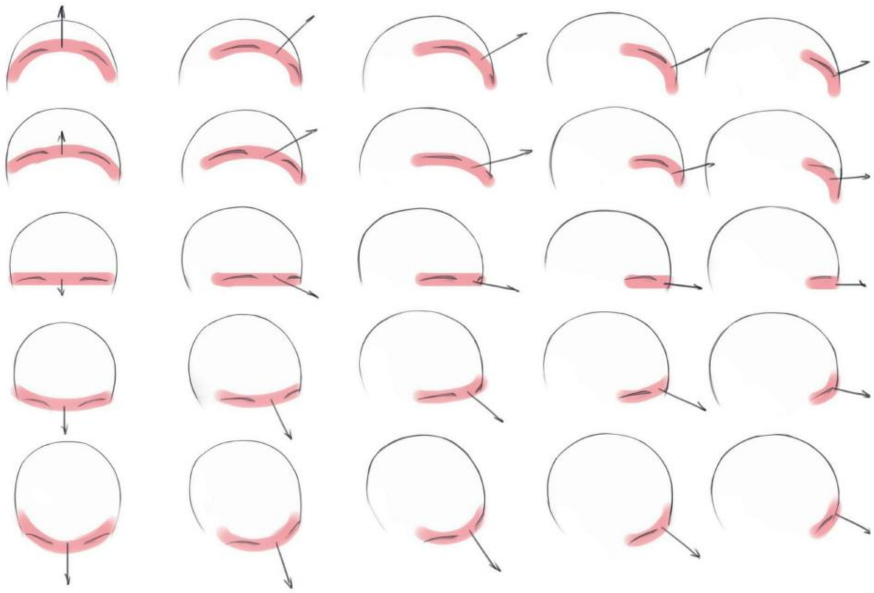
• Eyebrow styles and angles

Eyebrows are attached to the brow bone. There are many shapes of eyebrows, and the shape can be drawn according to the character's personality. When depicting facial expressions, the appropriate eyebrow shape should also be selected based on the specific

expression. The depiction of eyebrows mainly starts with their length, thickness, and the arch of the brow, brow peak, and brow tail.



Eyebrows should conform to the head structure and the laws of perspective.

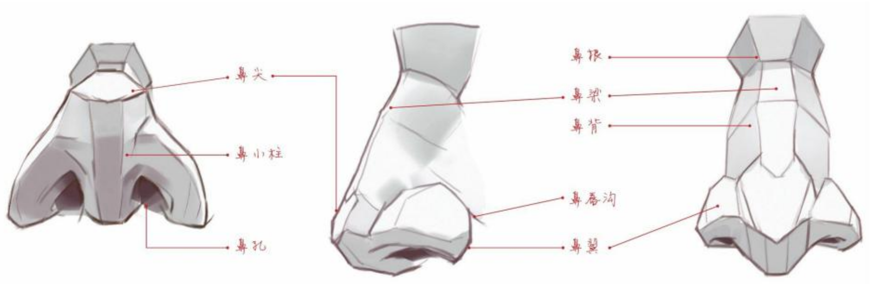


1.3.3 Nose

The nose is located in the center of the face and should be emphasized in realistic paintings. However, when drawing characters in anime style, the nose can be drawn more simply in order to highlight the eyes.

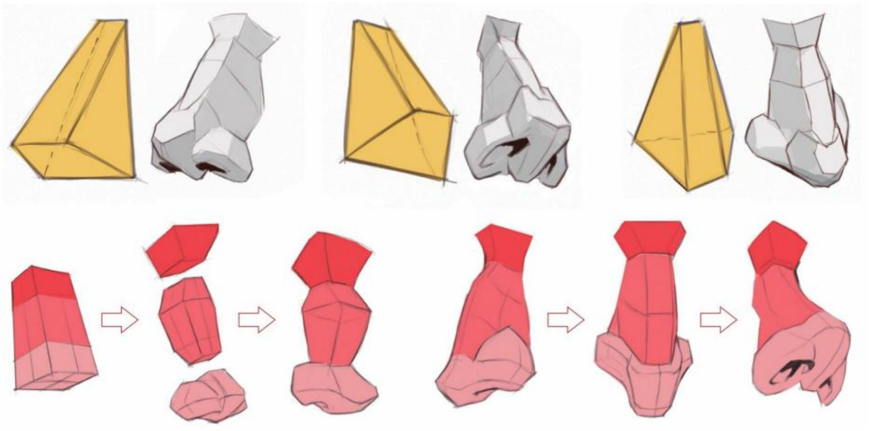
• Structure of the nose

The nose is mainly composed of structures such as the tip of the nose, columella, nostrils, root of the nose, bridge of the nose, dorsum of the nose, nasolabial groove, and alar.

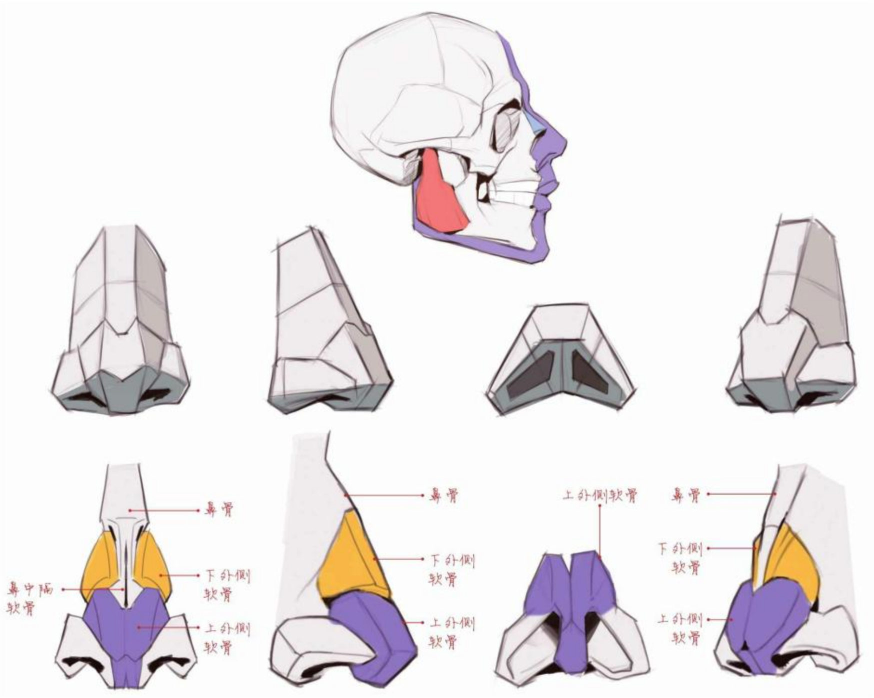


The nose as a whole resembles a three-dimensional trapezoid with a clearly defined facing direction. Further refining the trapezoidal shape...

This process can yield a more precise nose shape.



The nose is located in the center of the face and serves to indicate the direction the person's head is facing.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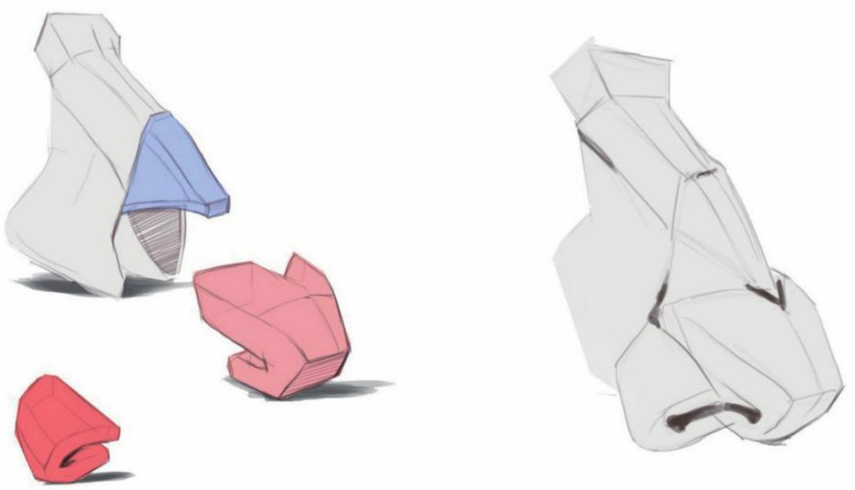
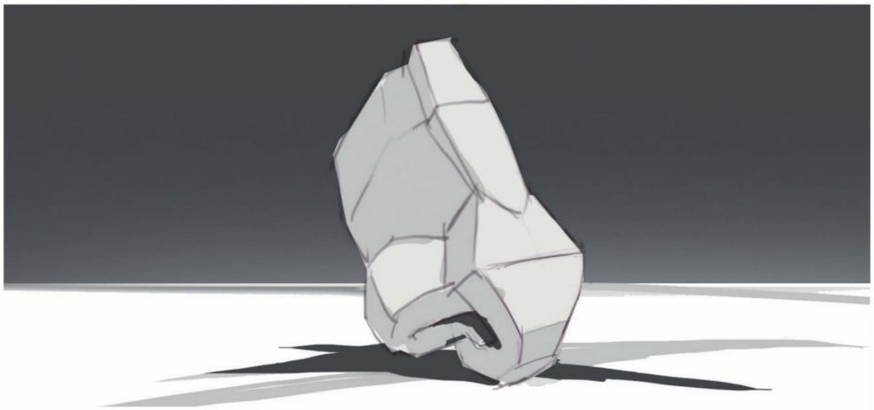
The nose has many cartilages, some of which are movable. Understanding the basic structure of the nose allows us to analyze the light and shadow on its surface based on the areas receiving light. To better draw a clear and well-structured sketch.



Nasal structure



Light and shadow practice

• Nose drawing process

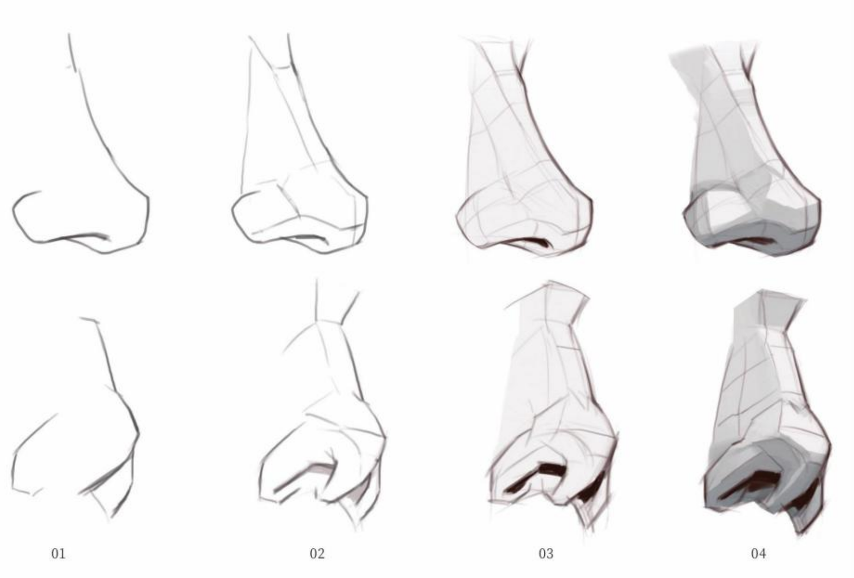
The process for drawing a nose is as follows.

01 Draw the geometric outline of the nose from different angles (pay attention to perspective).

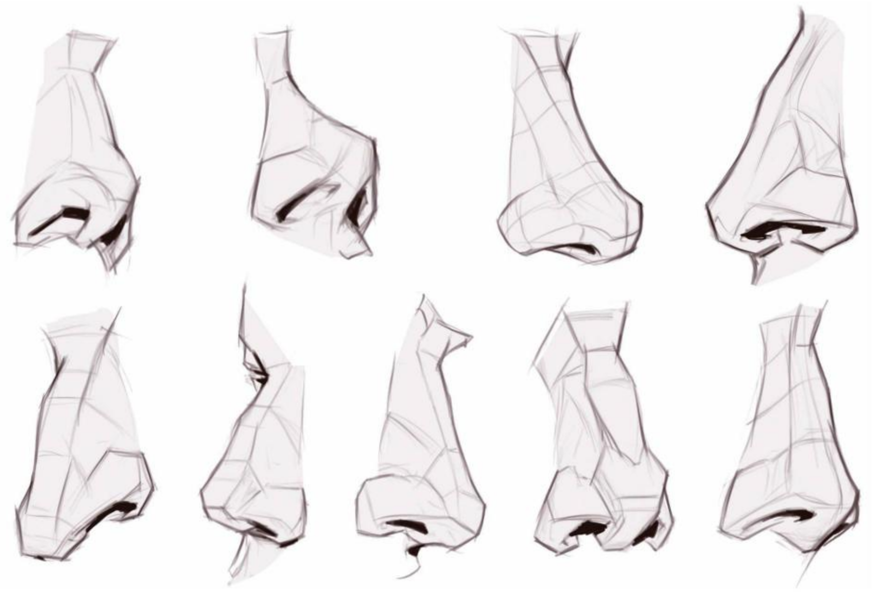
02. Subdivide the nose structure based on its geometric contours.

03. Fill in the color of the nose according to the shape of the drawing.

04. Intensify the depiction of the nose to make it more three-dimensional.

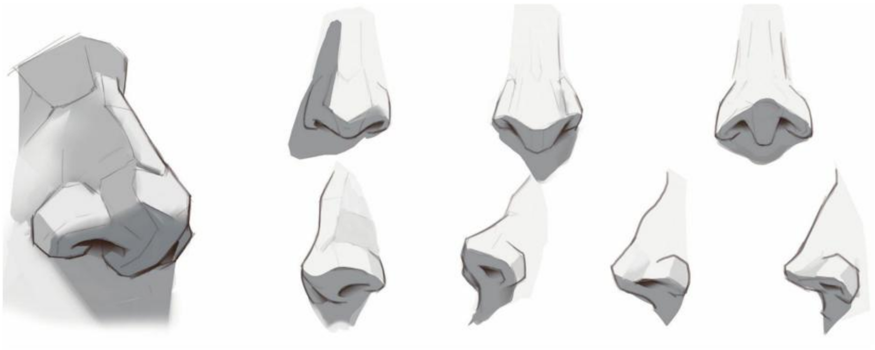


Then, use the same method to draw more noses in different shapes and styles.



• Nose presentation in different styles and angles

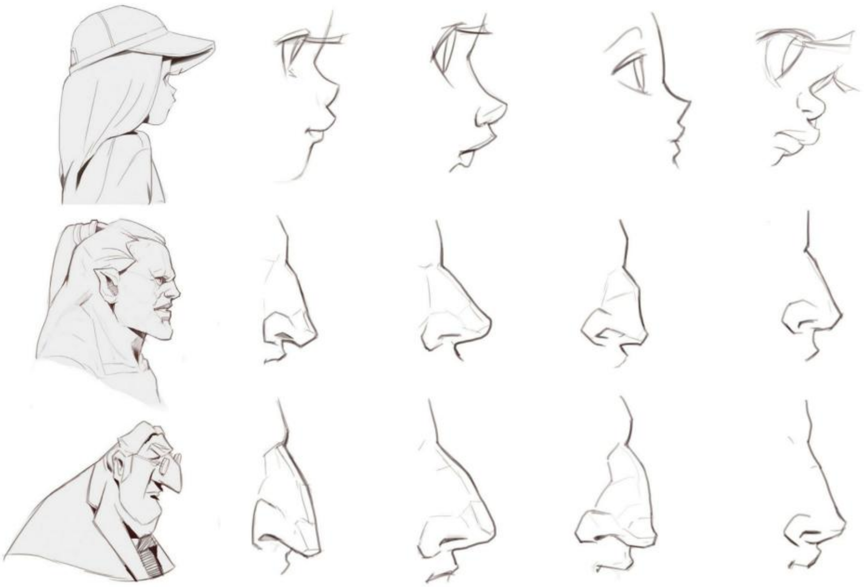
To draw a nose well from various angles, you must master its perspective. First, observe the position of the base of the nose from different angles and shape it using the outlines of the nostrils or wings. Then, depict the shape and size of the tip of the nose, as well as the undulations and length variations of the bridge. Finally, draw the shadows on the nose.



When depicting the nose, special attention should be paid to the bridge, tip, and nostrils. The tip of the nose is generally larger from the front and side views, while the bridge becomes smaller from the side.

There will be a lot of chemical reactions.

Different types of nose contours can reflect different personalities.



hint

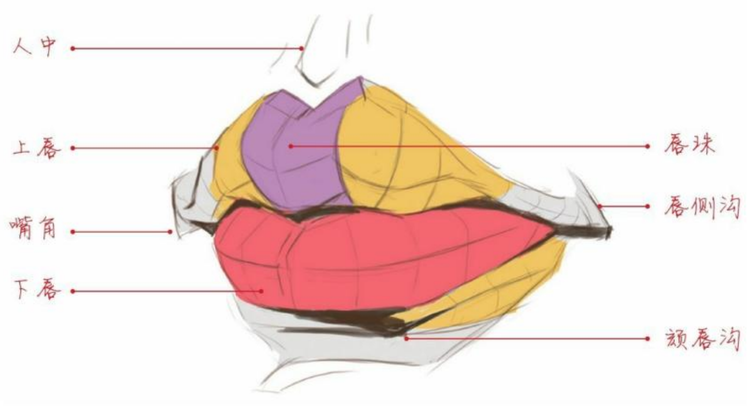
When drawing the head of a two-dimensional character, the nose is usually minimized to make it appear smaller and more delicate, in order to highlight the eyes.

1.3.4 Mouth

The mouth can express complex movements. When depicting a person, various expressions can be portrayed by adjusting the mouth and eyes. For this reason, the mouth is also a relatively complex and difficult part to draw.

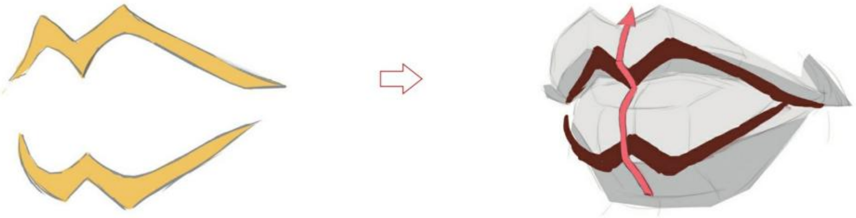
• Structure of the mouth

To avoid drawing a flat mouth, you need to understand and represent its structure. The structure of a mouth can generally be divided into the upper and lower lips, the cupid's bow, the corners of the mouth, and the philtrum.

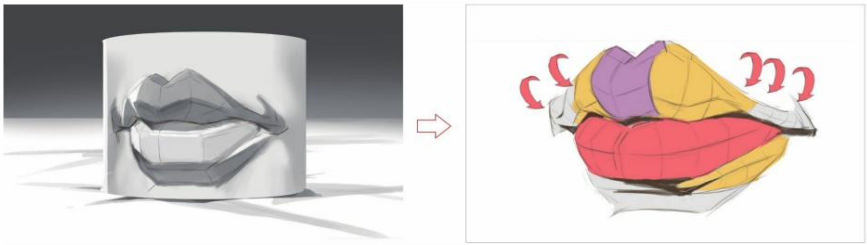


To depict the structure of the lips, draw a curve along the teeth, thickening towards the center, with the upper lip resting on the lower lip. Therefore, the lower lip is narrower and less prominent than the upper lip. There will also be shadows at the corners of the mouth. The bulge in the middle of the upper lip is the cupid's bow, with slight bulges on either side. The lower lip only has slight bulges on the left and right sides, with a slight indentation in the middle.

The mouth is a relatively soft part, so pay attention to the vertical undulations of the mouth and try to draw a three-dimensional effect.



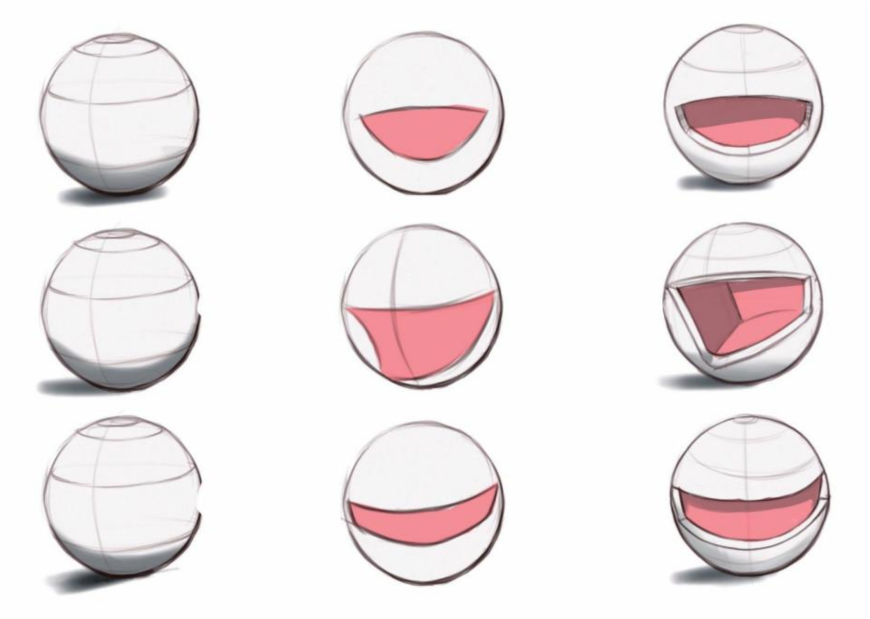
The cross-section of the mouth is an arc surface, so be sure to show it when drawing, and also pay attention to the corners of the mouth. A turning point or change.



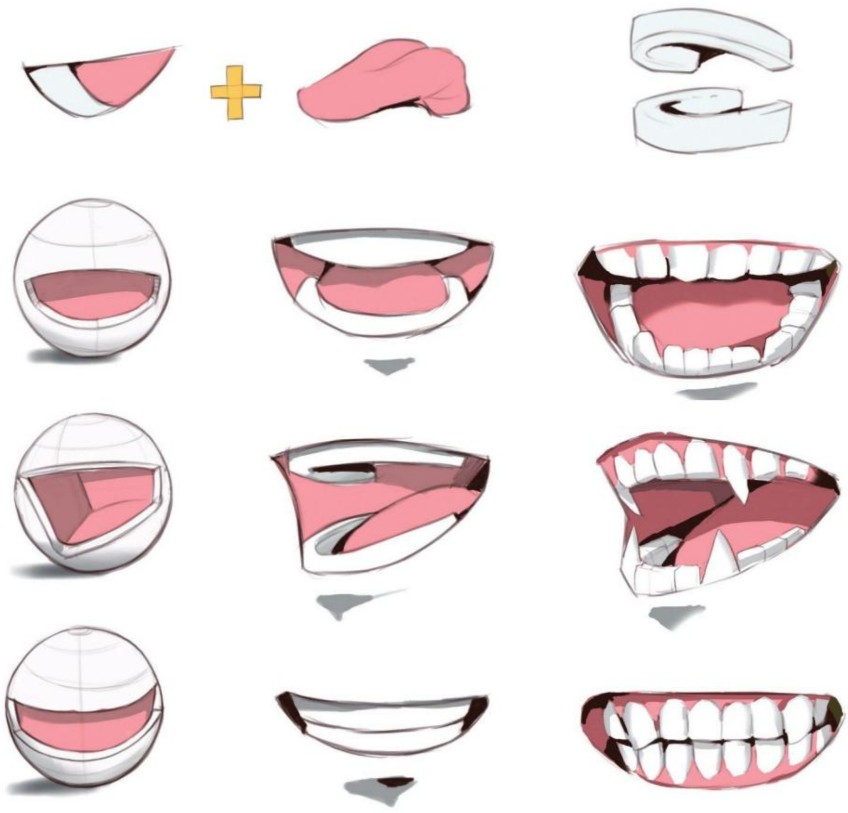
When drawing a mouth, the lips are rarely drawn; instead, the mouth is usually depicted in a general, abstract way. Shape (except for drawing a realistic mouth).

Imagine the mouth as a sphere, and the mouth is drawn on the sphere. Different angles of the sphere will also...

It changes the shape of the mouth.



Having understood the overall structure of the mouth, it's also necessary to understand its internal structure. The internal structure of the mouth includes the teeth, tongue, and gums. When drawing, you can start by sketching these structures and then move on to more detailed rendering.



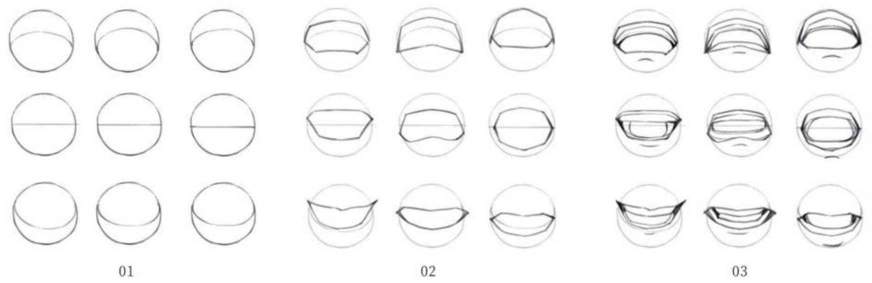
- The process of drawing a mouth

The process of drawing the mouth is as follows.

01 Draw spherical structures from different angles.

02 Draw the shape of the mouth based on the spherical structure, and draw the mouth from the upward and downward angles for comparison.

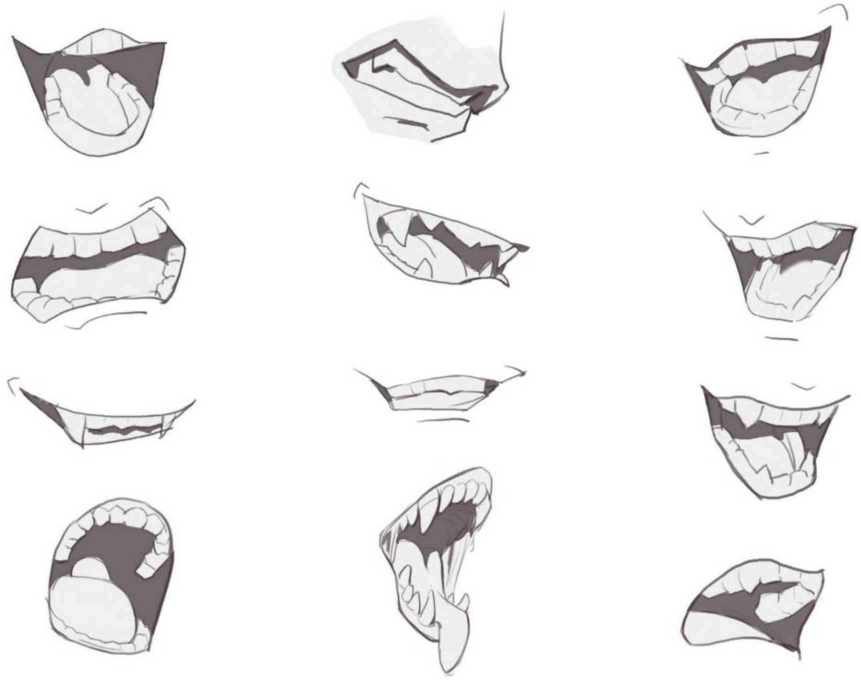
03 Draw the teeth and tongue to make the mouth appear more complete.



- Different styles and angles of mouth expression

Most people usually use a simple line to represent the mouth, and only draw the internal structure of the mouth when it is open.

In the case of anime-style characters, the upper and lower lips are rarely drawn.



1.3.5 Ears

The ear is composed of the inner and outer helixes, antihelix, tragus, antitragus, and earlobe, except for...

The earlobe is composed of fat tissue, while the rest is made of cartilage. The ear is generally wider at the top and narrower at the bottom, with a concave bowl-shaped center.

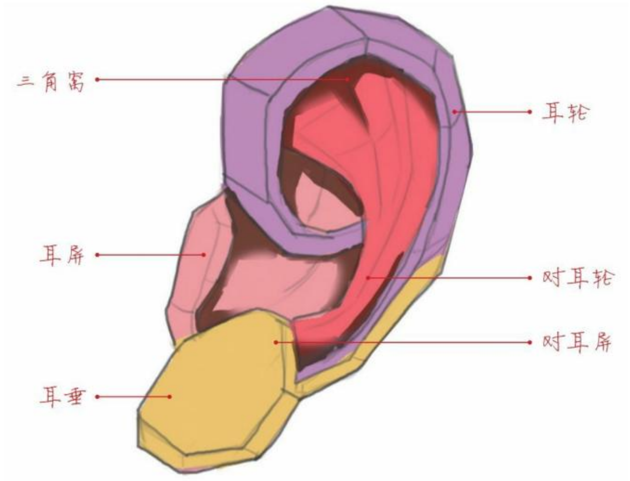
• Structure of the ear

The ears are the least noticeable part of the face, located on the sides of the head. Vertically...

It is said that the ears are located in the middle of the head.

For beginners learning to draw portraits, the structure of the ear is quite complex. To make it easier to remember...

The word "memory" can be understood by breaking down the ear into several simple blocks.


三角窝
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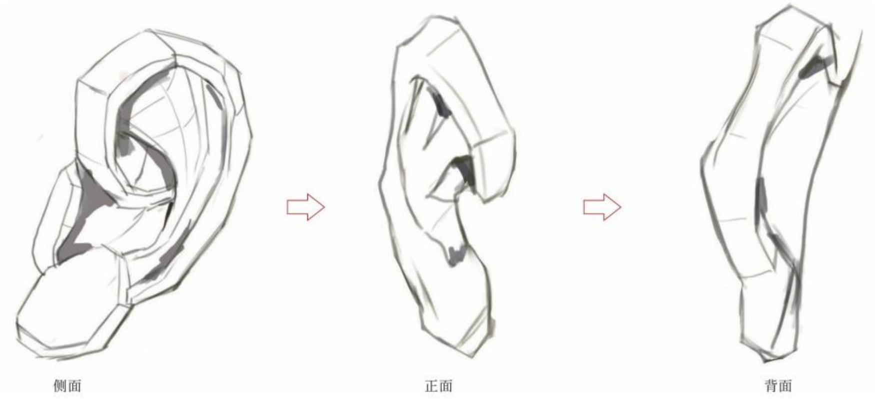
对耳轮
对耳屏
耳垂



• Ear drawing process

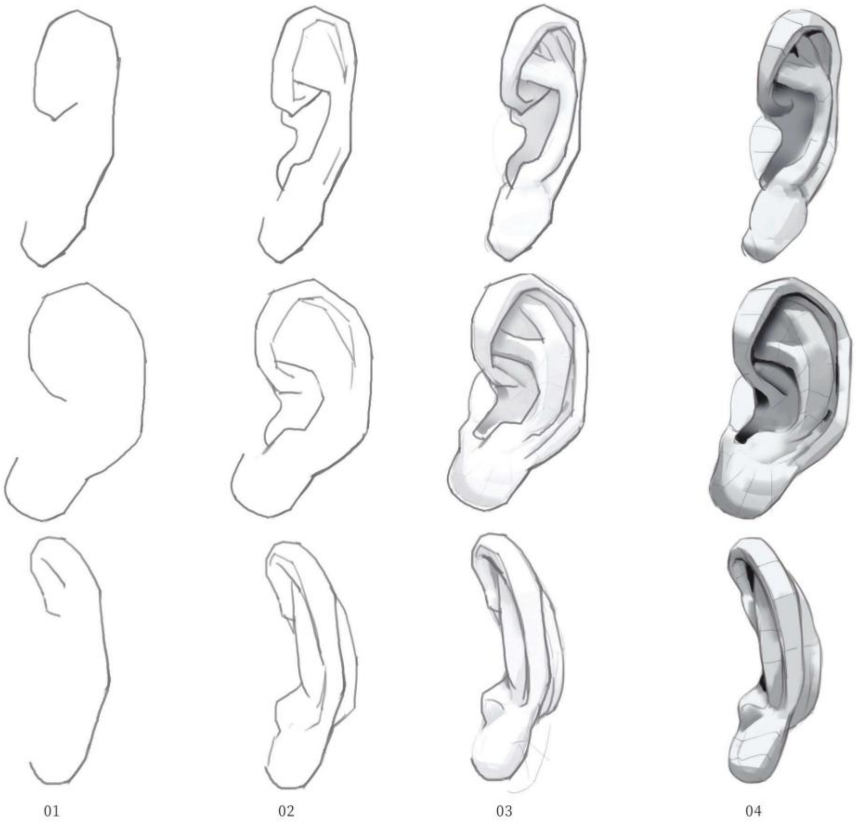
The process for drawing the ear is as follows.

01 Draw a simple geometric outline of the ear from different angles, paying attention to perspective.

02. Refine the ear structure according to the geometric outline.

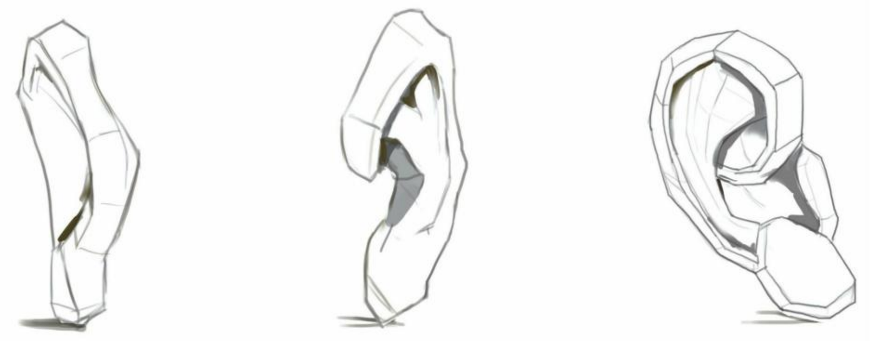
03. Based on the shape of the ear, fill the outline of the ear with a two-tone color.

04. Depict the structure of the ear in detail to make it more complete.



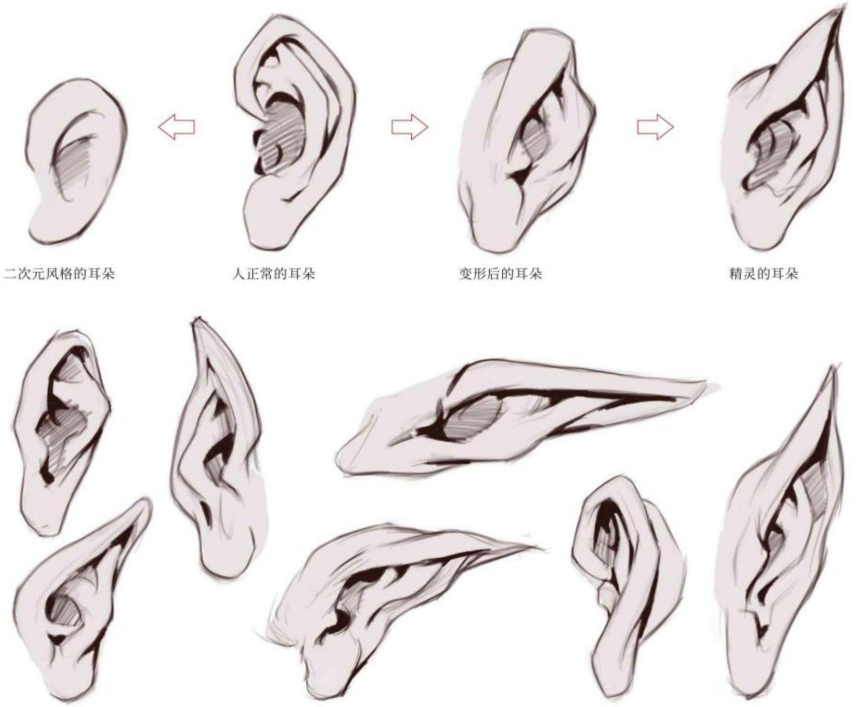
• Different styles and angles of ear expression

The following shows the different angles of a typical ear.

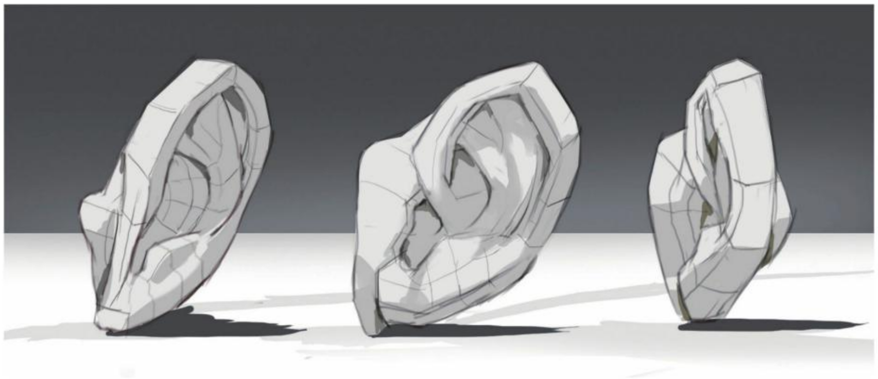


The ears of elves in anime and fantasy worlds are based on the structure of ears in ordinary styles.

It evolved from the above.


二次元风格的耳朵
人正常的耳朵
变形后的耳朵
精灵的耳朵

When actually drawing, pay attention to the changes in light and shadow on the ear from different angles.



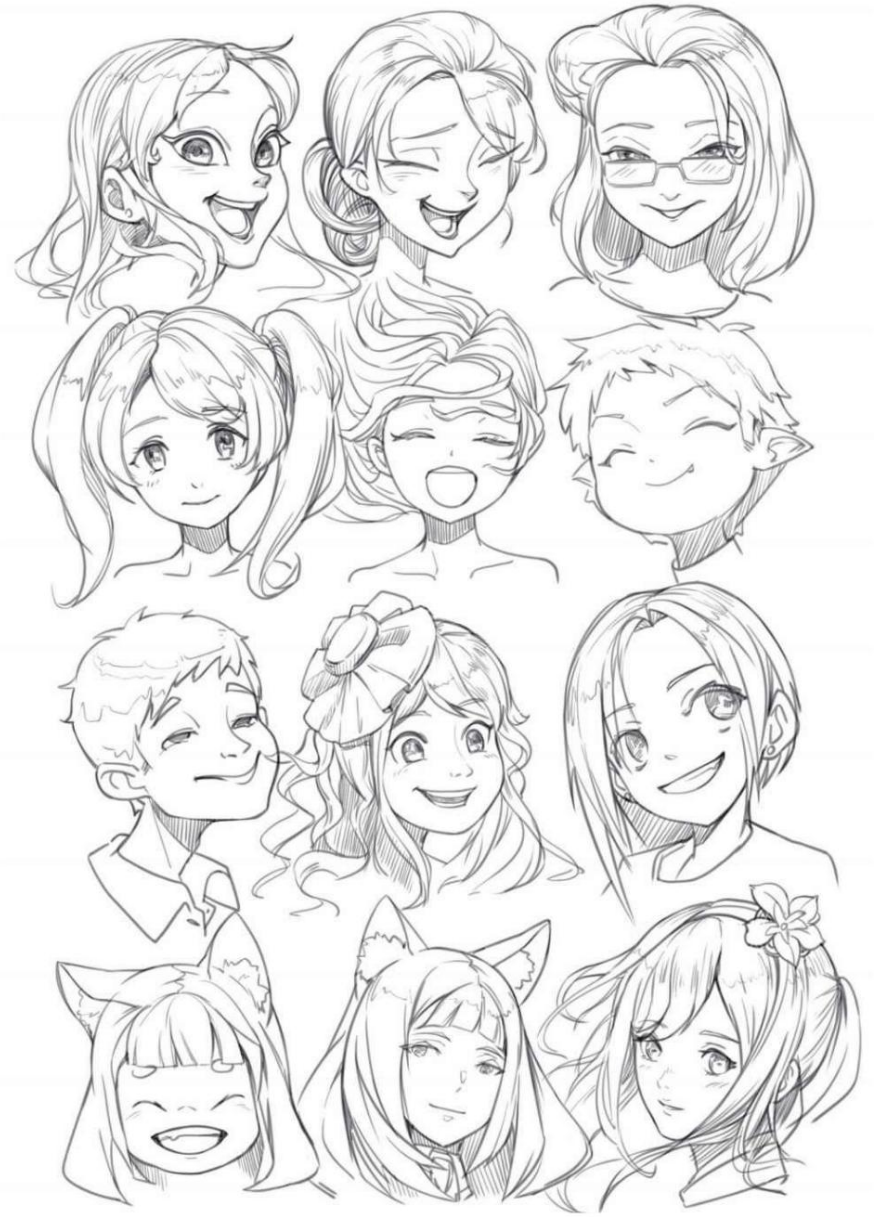
1.3.6 Facial Expressions

Human expressions are varied, and each expression follows certain patterns of facial changes. However, due to... People have different appearances and personalities, and the expressions they make will also vary.

Changes in human facial expressions are mainly reflected in the shape of the eyebrows, eyes, and mouth. By adjusting the shape of the facial features, a wide range of human expressions can be conveyed.

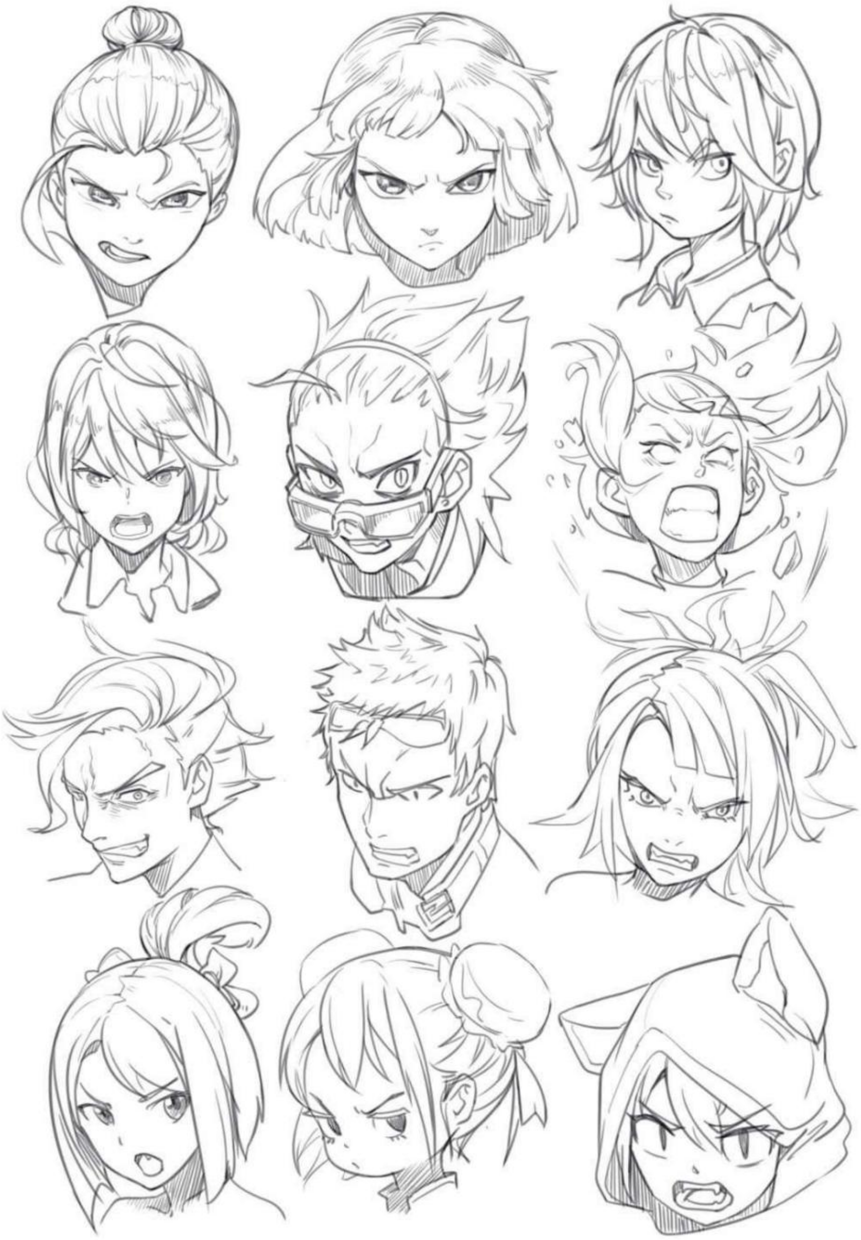
The following demonstration and analysis will use six basic expressions—joy, anger, sorrow, surprise, fear, and disgust (contempt)—as

examples. Joy: When a person is smiling, their face relaxes. Therefore, when drawing this expression, pay attention to increasing the distance between the eyebrows and eyes to show the relaxed state of the person. In addition, draw the corners of the mouth slightly upturned.



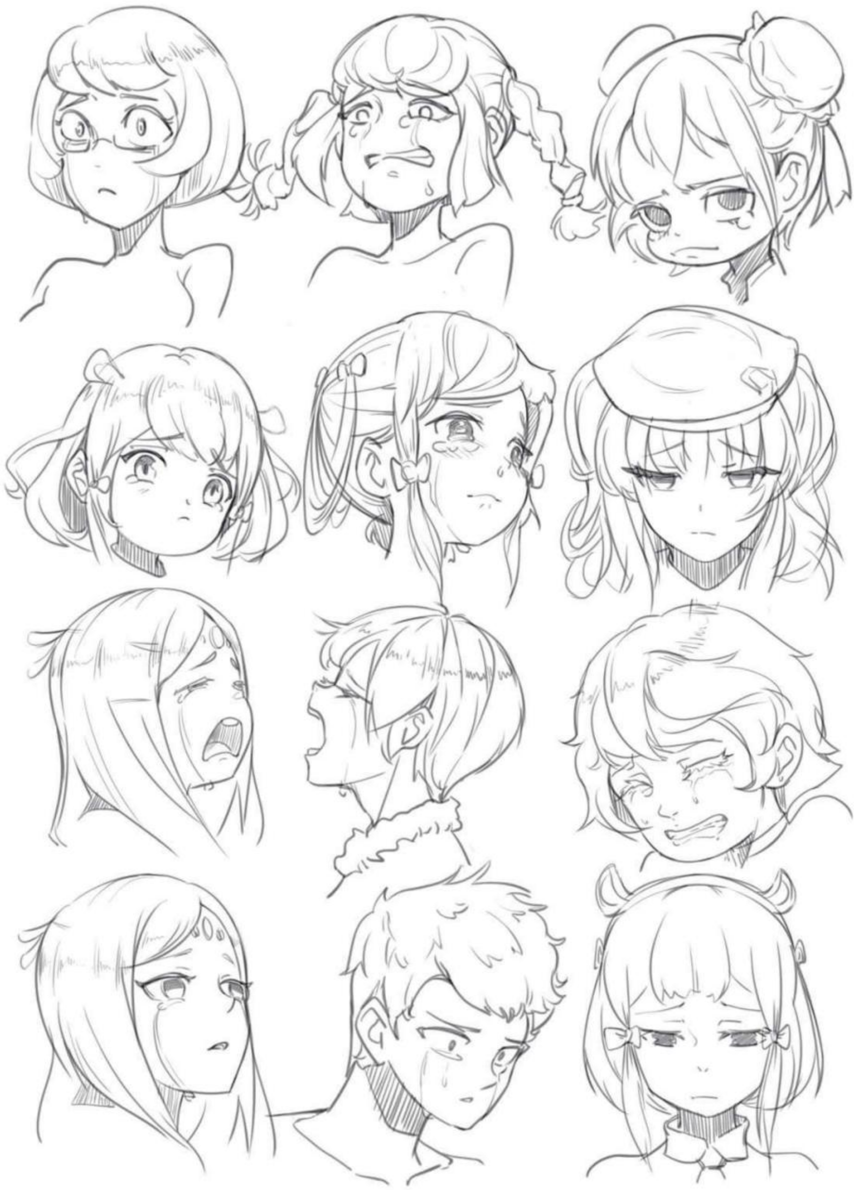
Anger: When a person is angry, the main facial feature is that the distance between the eyebrows and eyes is relatively close, and the eyebrows...

The eyes are upturned, giving the impression of tension, and the pupils are constricted, making them appear smaller.



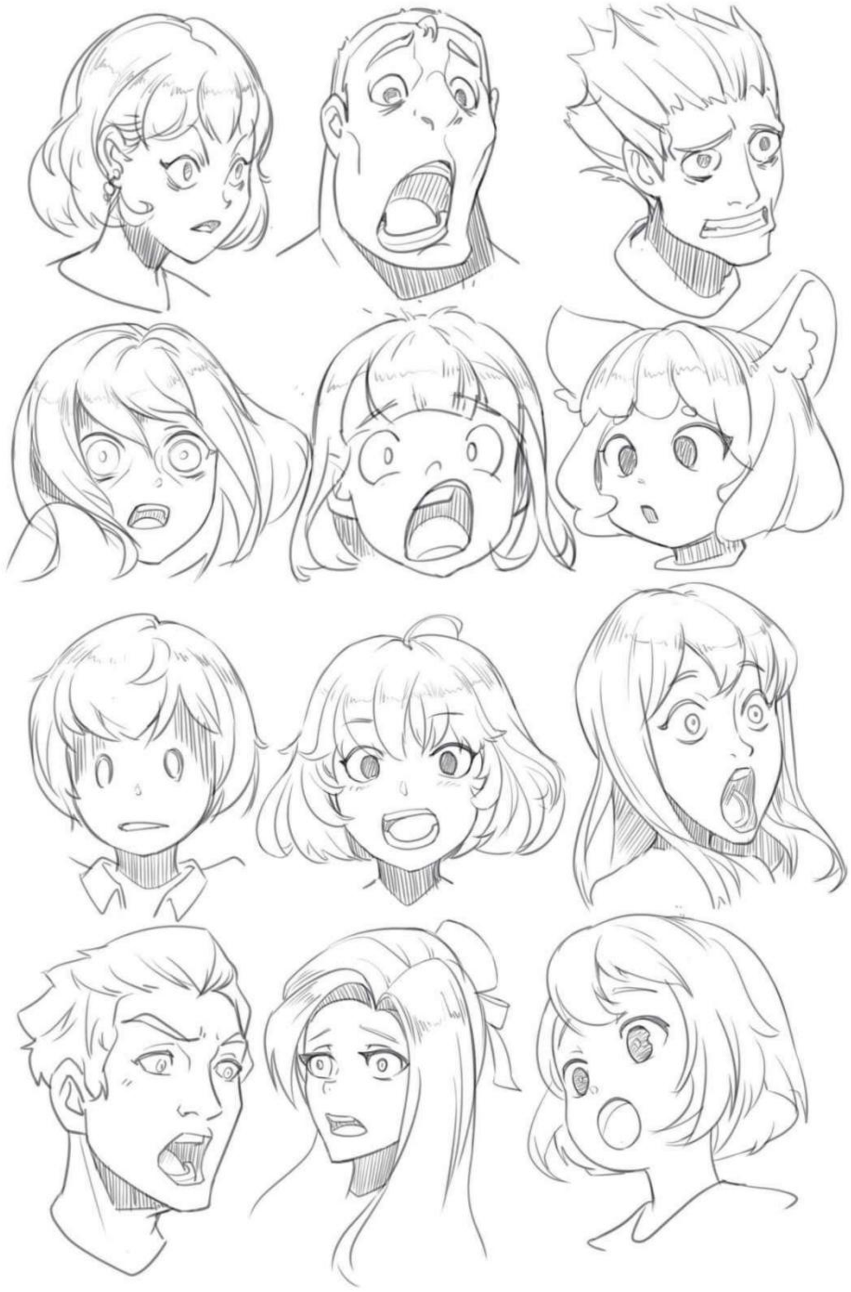
Sorrow: When a person is grieving, their eyebrows are generally shaped like the number "8", and their eyes may be wide open, lowered, or closed.

The presence of a divine presence, combined with the unique state of other expressions, makes the expression of sorrow appear more delicate and subtle.

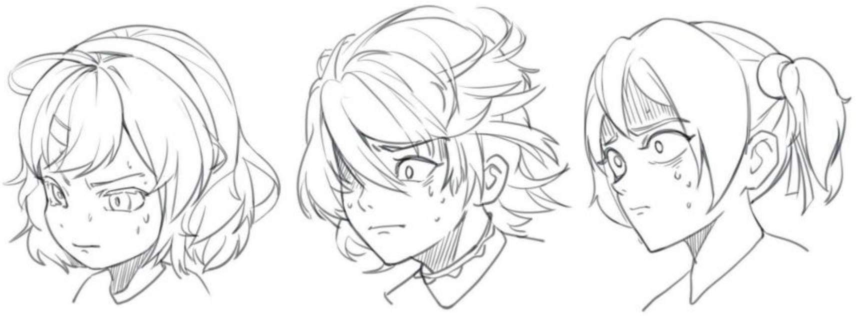


Surprise: When a person is surprised, their eyes widen, their pupils constrict, and their eyebrows are generally farther from their eyes.

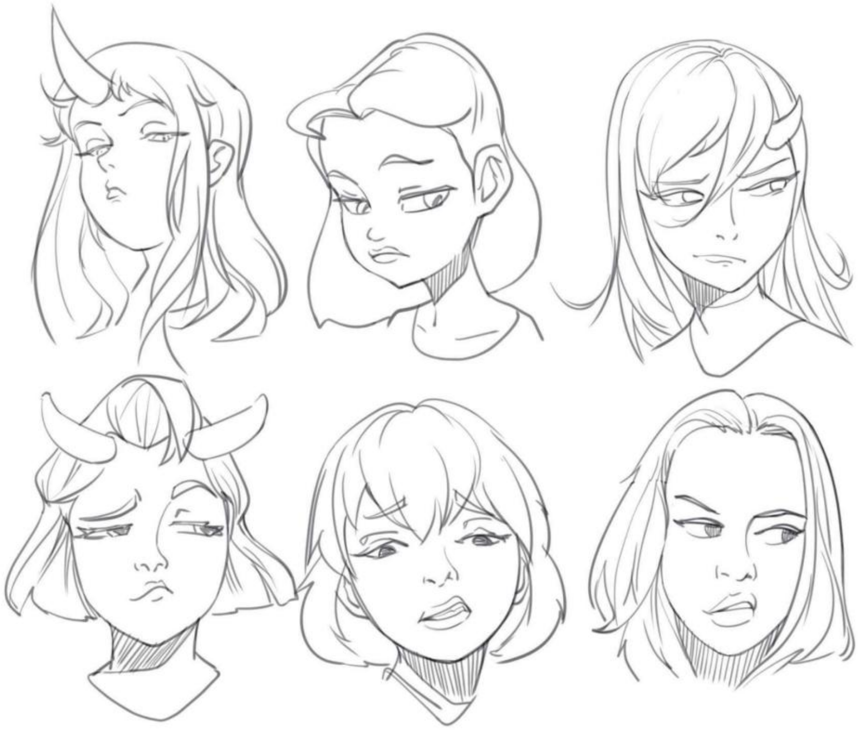
It is shaped like the number "8" and its mouth is mostly open.



Fear: When people are afraid, their brows furrow due to emotional tension. Compared to a surprised expression, their eyebrows are closer to their eyes, their mouths are closed, and their pupils are constricted. Fine beads of sweat can be drawn on the face to express the tension caused by excessive fear.

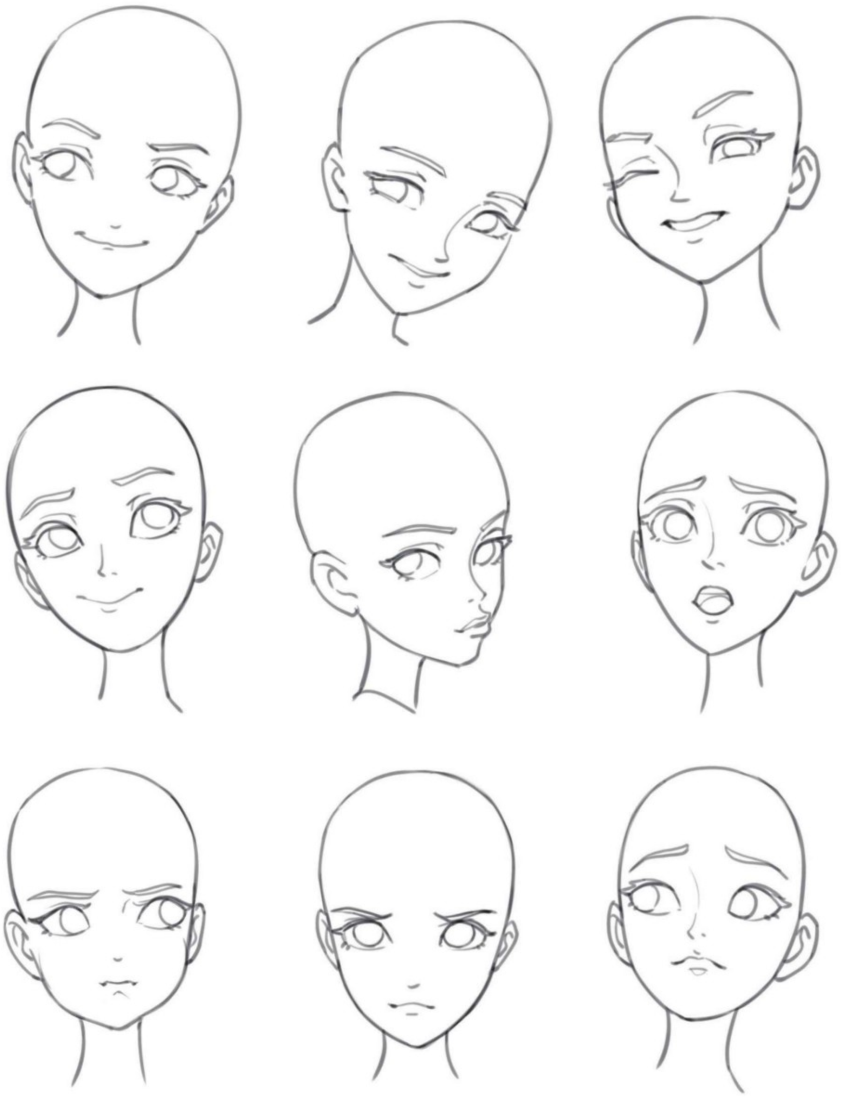


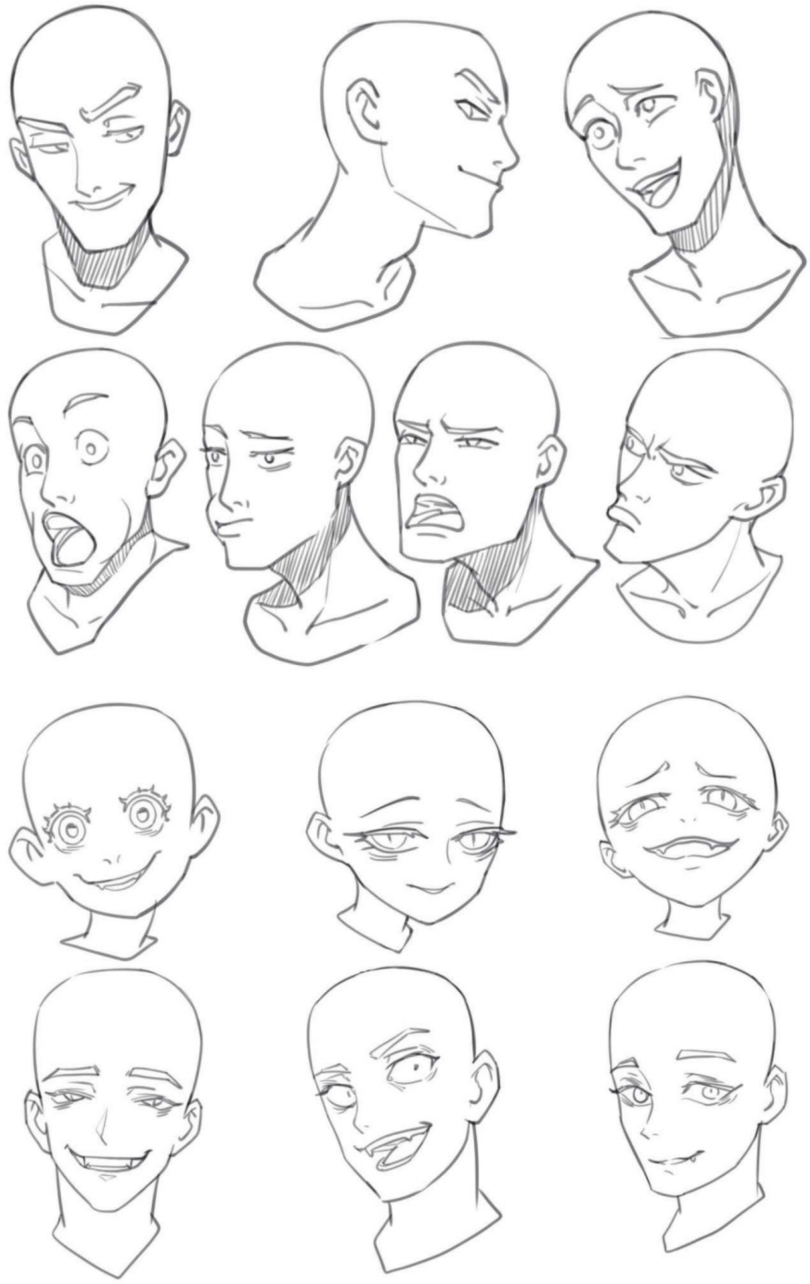
Disgust (contempt): When people have this kind of expression, they often show a feeling of disdain. Their eyes look to one side, their mouths are pursed, and their eyebrows usually change in height.

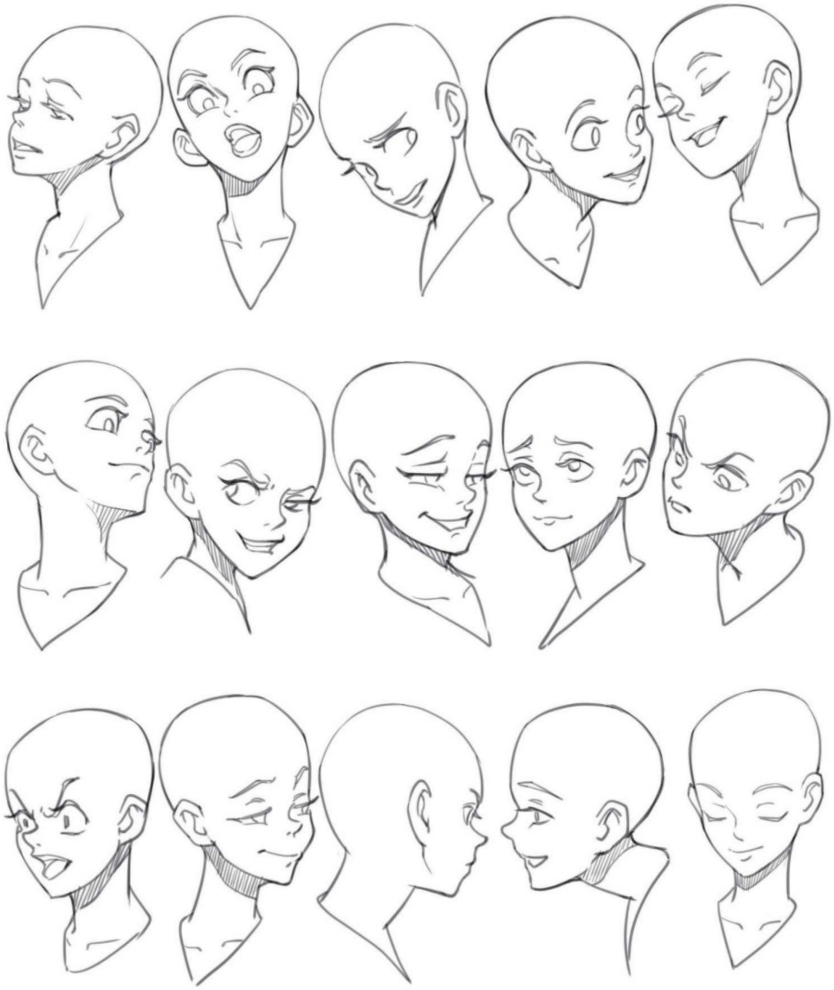


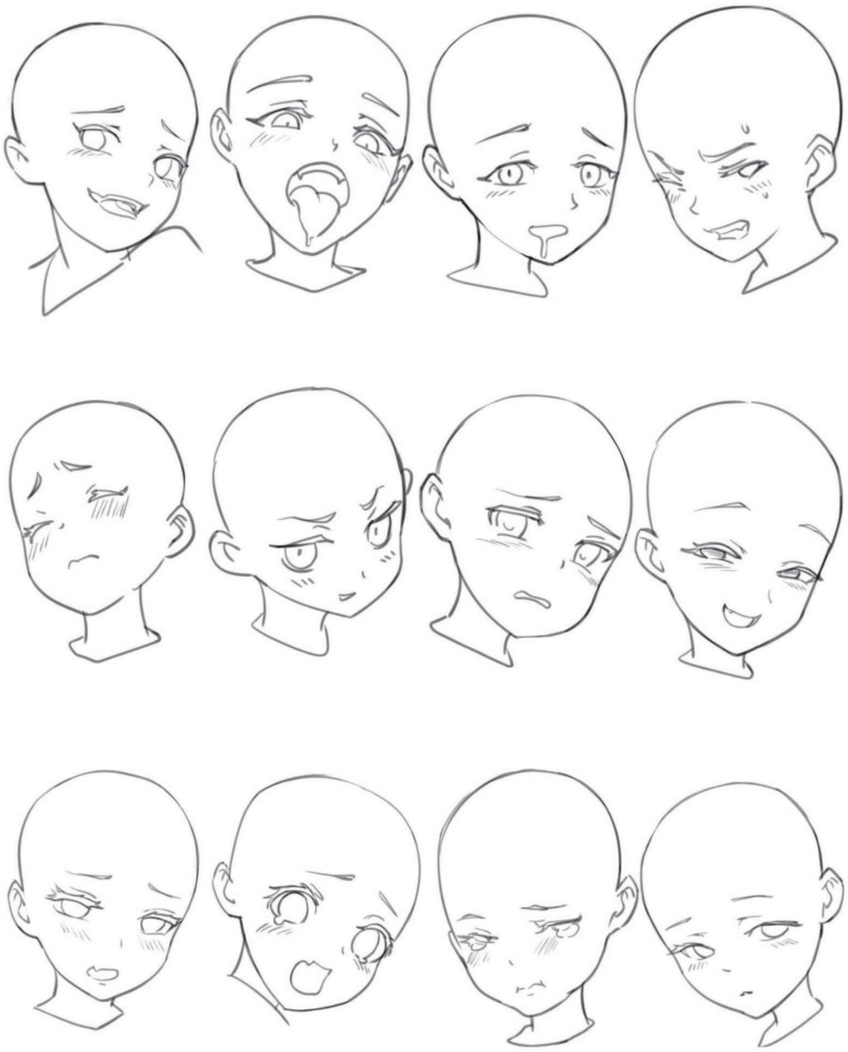
In addition to the common expressions mentioned above, there are also expressions that combine two emotions. Emotions, such as surprise and fear, bitter smile and so on.

In addition, some expressions are very subtle. In actual painting, in order to make the face of a person more vivid, you should pay more attention to the subtle changes in facial expressions, focus on depicting the eyes, eyebrows and corners of the mouth, and at the same time pay attention to controlling the distance between the facial features.









1.4 hair

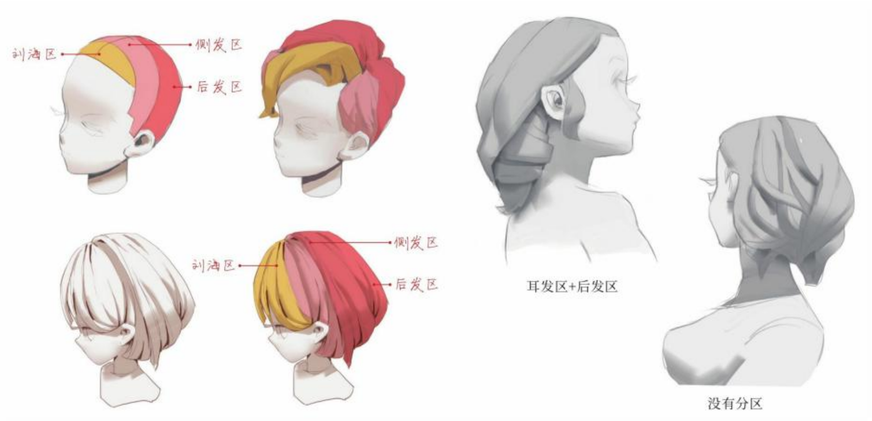
A good character should be unforgettable. And hair styling is crucial in character development; the shape of the hair is even more important than the depiction of the face.

1.4.1 Understanding Hair

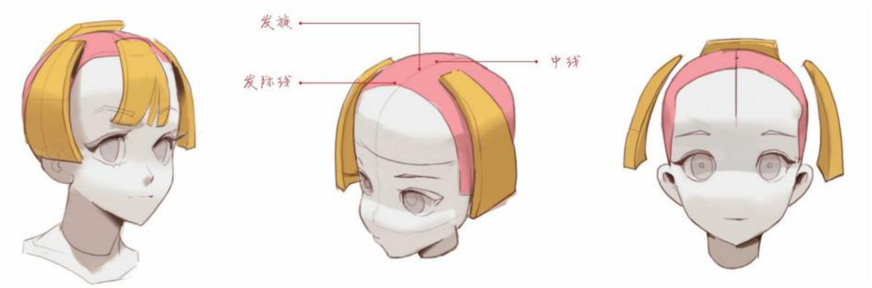
We will now explain hair from three aspects.

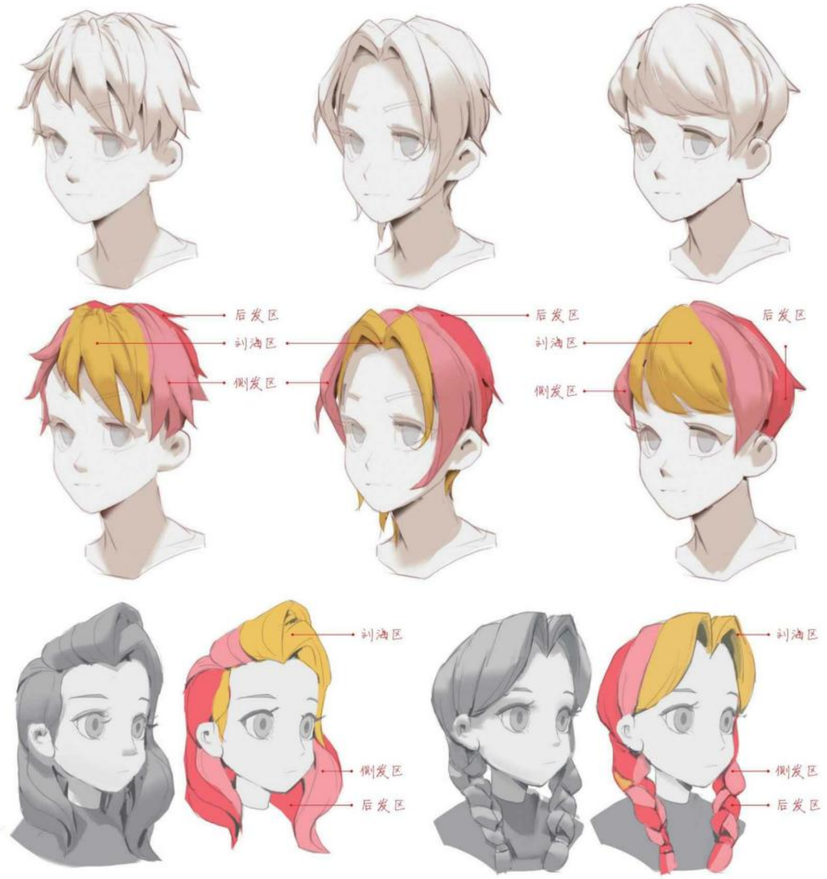
• Hair sectioning and the relationship between hair and head

Hair is generally divided into bangs, side sections, and back sections, etc. Different hairstyles have different hair sectioning. They are also different. Some hairstyles may not have sections or have fewer sections (such as some hairstyles without bangs, and the side section and back section of a single ponytail hairstyle are combined into one).



In addition, it is also necessary to understand concepts such as hairline, hair whorl, and midline of the hair.

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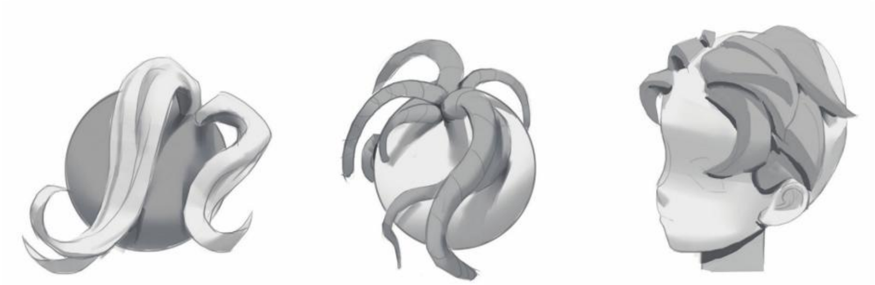
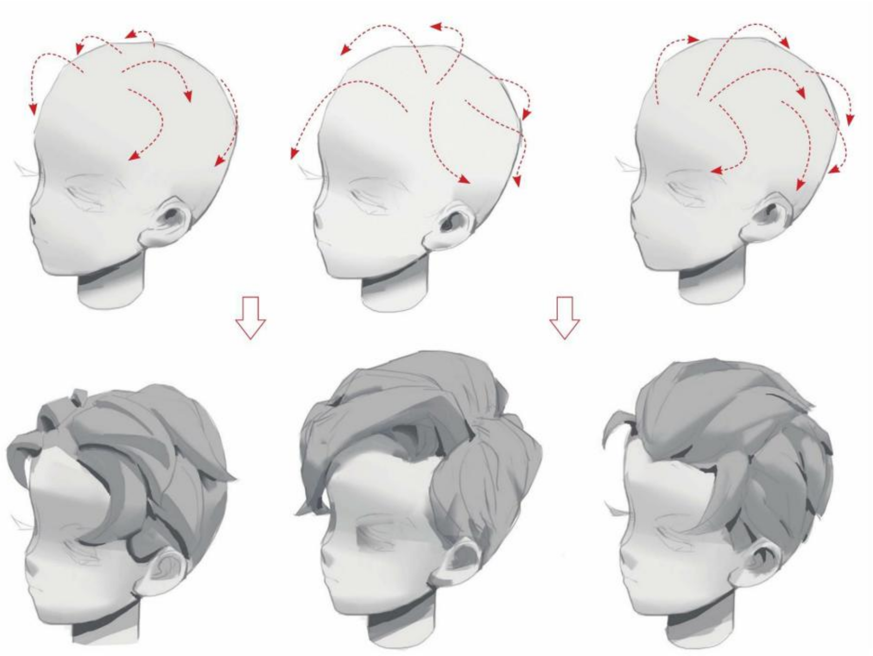
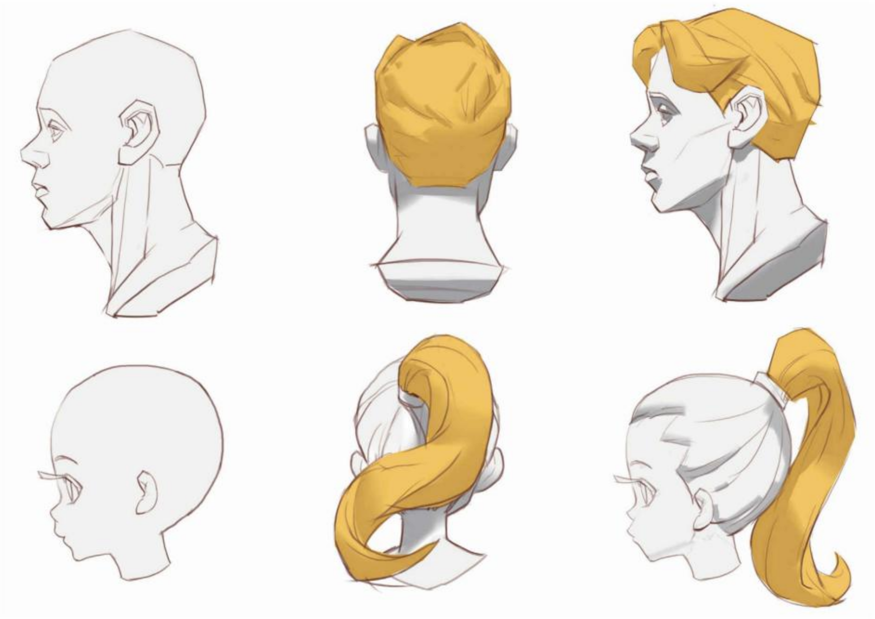
When designing a hairstyle, the midline of the hair can be adjusted.



Once the midline is determined, the direction in which the hair extends on the head can be designed according to the hair's growth characteristics.

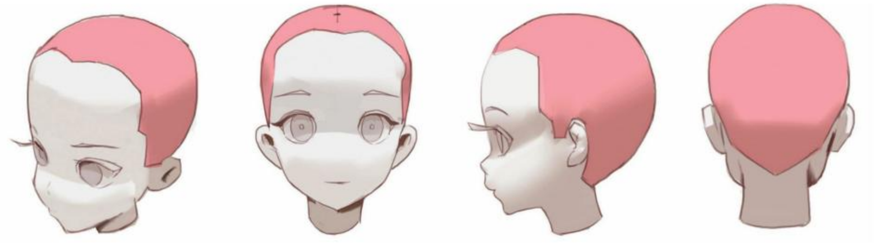


The relationship between the hair sectioning on the sides and back of the head and the head's overall shape is as follows.



• The position and shape of the hairline

The shape of the hairline is related to the scalp covering the head (the area where hair grows). Everyone's scalp shape is different, and it can be adjusted appropriately when drawing to represent different styles of characters.



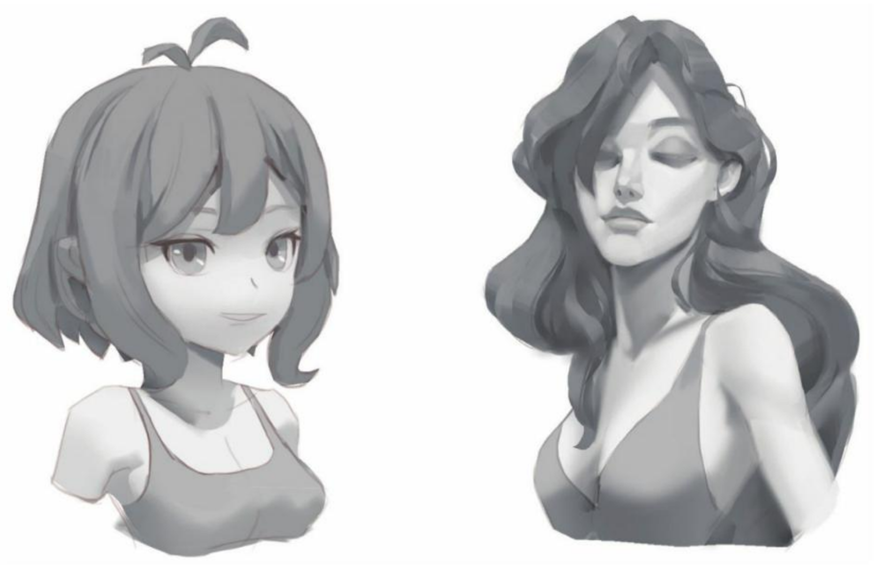
Besides the shape of the hairline significantly affecting a character's appearance, the position of the hairline also has an impact. For

example, children and the elderly tend to have higher hairlines, while the average young person has a slightly lower hairline.

• The impact of hairstyle on a character

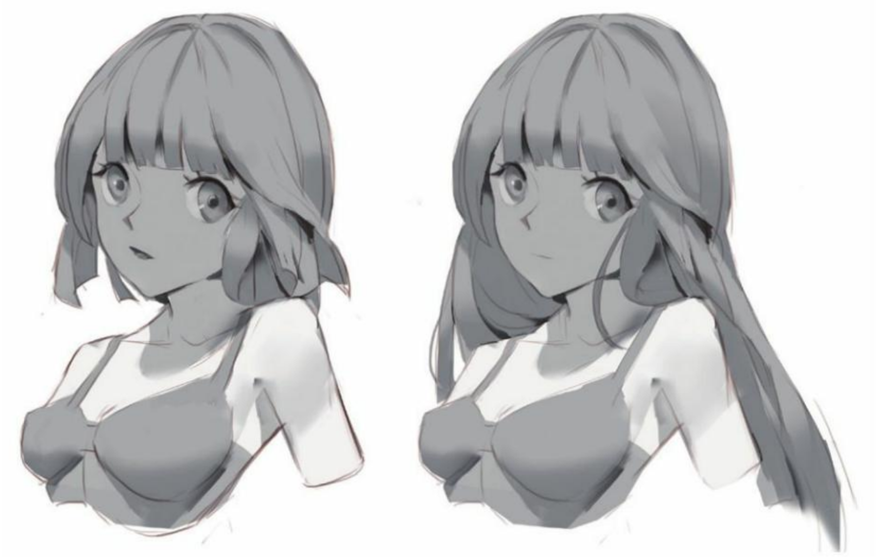
When portraying different characters, if you don't have any ideas about the character's hairstyle, you might as well start with...

Start by understanding the character's personality and then choose a suitable hairstyle based on that personality and temperament.

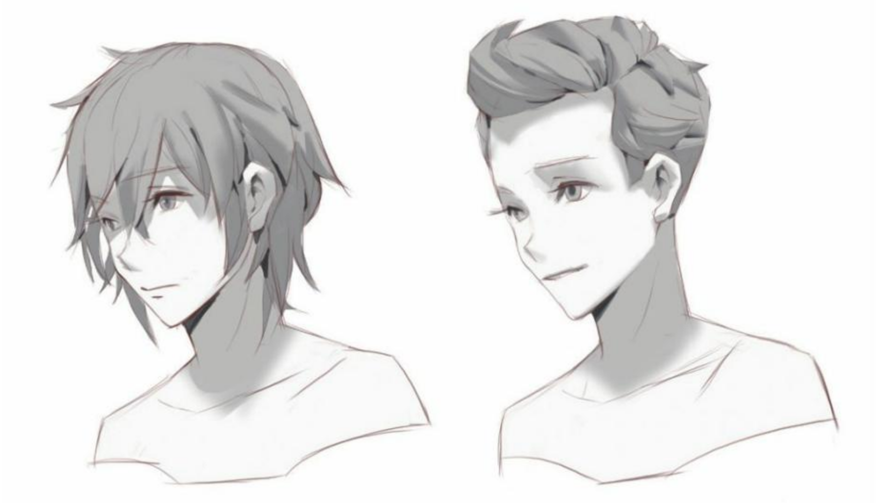


Generally speaking, girls with short hair tend to have more lively and cheerful personalities, while girls with long hair tend to appear...

More gentle and dignified.

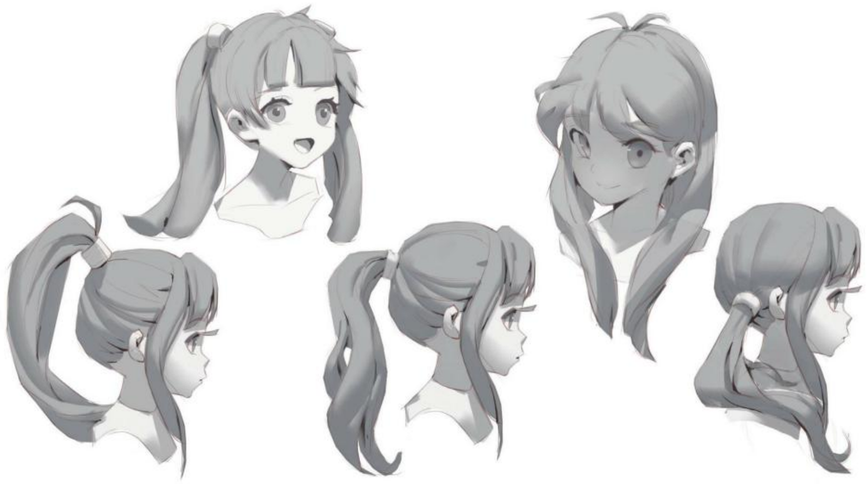


The length of a man's hair can also reflect his personality. Men with short hair appear more sunny and carefree, while men with long hair appear more quiet and composed.



Besides the length of hair affecting a character's image, different hairstyles can also change that image. For example, a girl with a high ponytail gives

off a younger and more energetic vibe, while other hairstyles might give off a more mature and serene feeling.

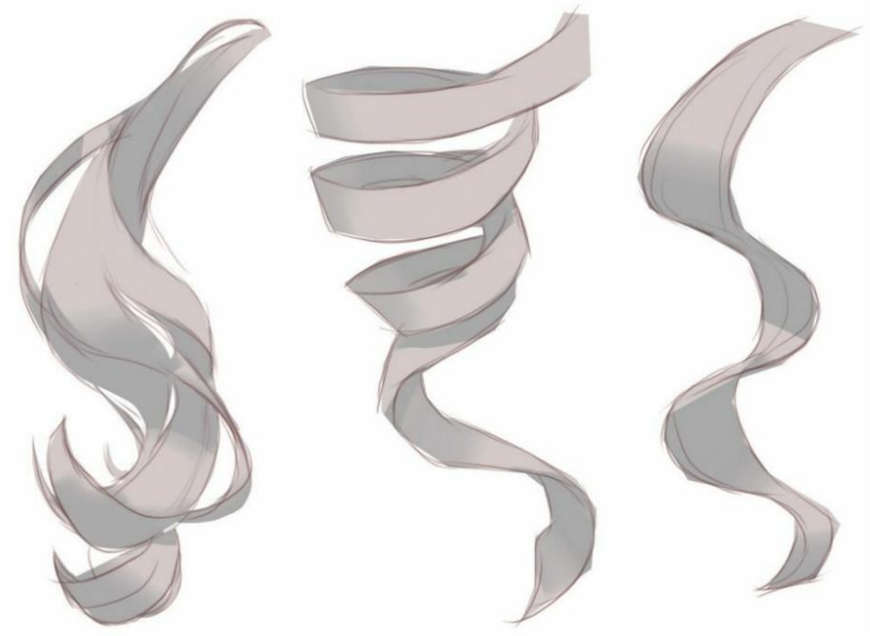


1.4.2 Basic Morphological Manifestations of Hair

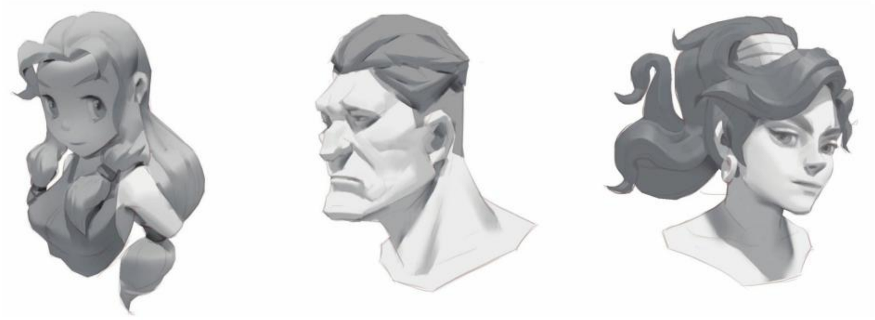
The basic shape and appearance of hair will be explained below.

• Drawing a single strand of hair

A single strand of hair is a small unit that makes up a hairstyle, and the shape of the strands varies depending on the hairstyle. When drawing a single strand of hair, you should pay attention not only to the direction of the hair, but also to the changes in the thickness and curvature of the hair.



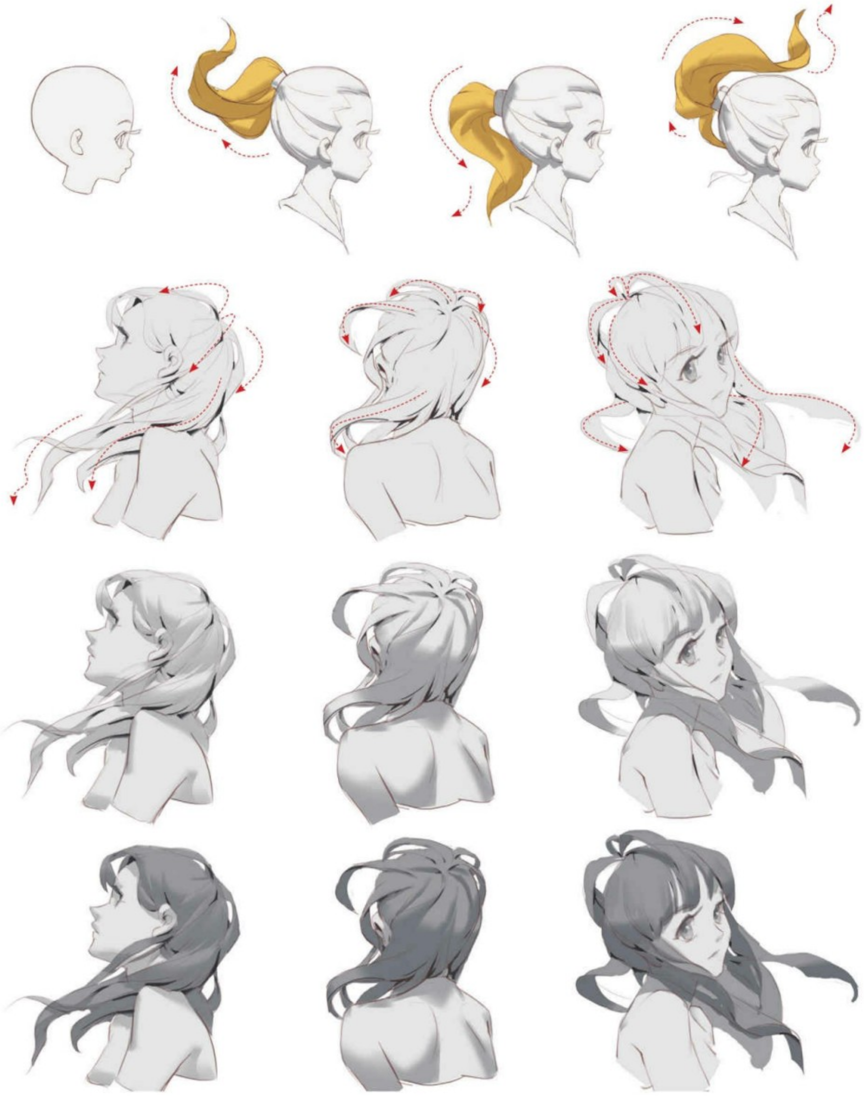
When arranging and combining individual strands of hair, it's important to understand the relationship between the roots and the strands. This is especially true when creating more dramatic hairstyles, as it makes the hair look more realistic.



• Drawing different styles of hair

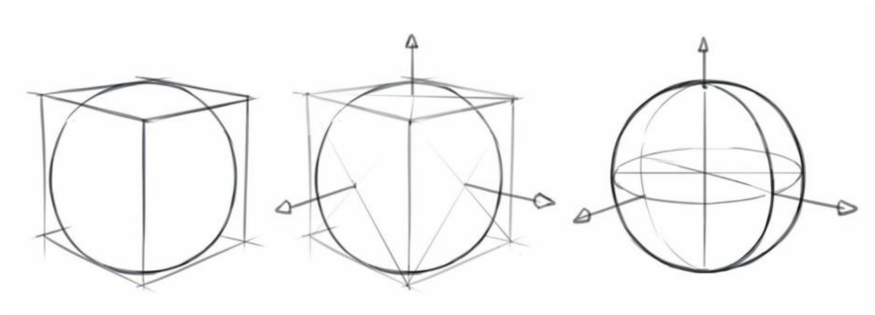
This section primarily uses flowing hair as an example to demonstrate the effects of different hair styles.

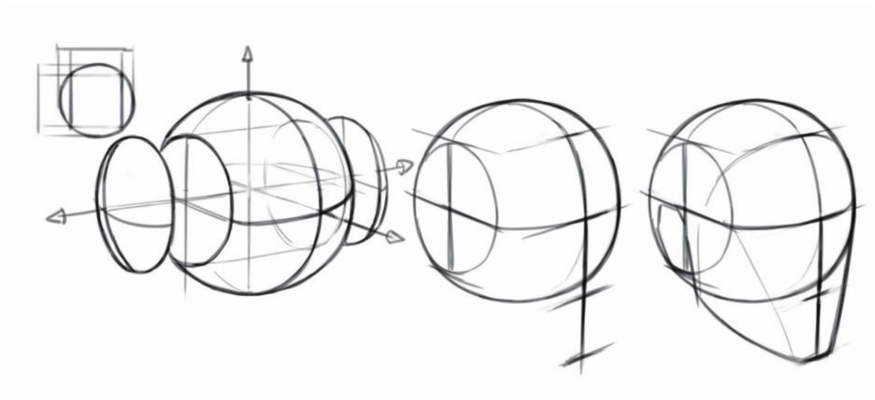
When drawing flowing hair, the direction of the wind and the influence of gravity must be considered. First, design the hair... Draw the hair strands following the curve of the hair.



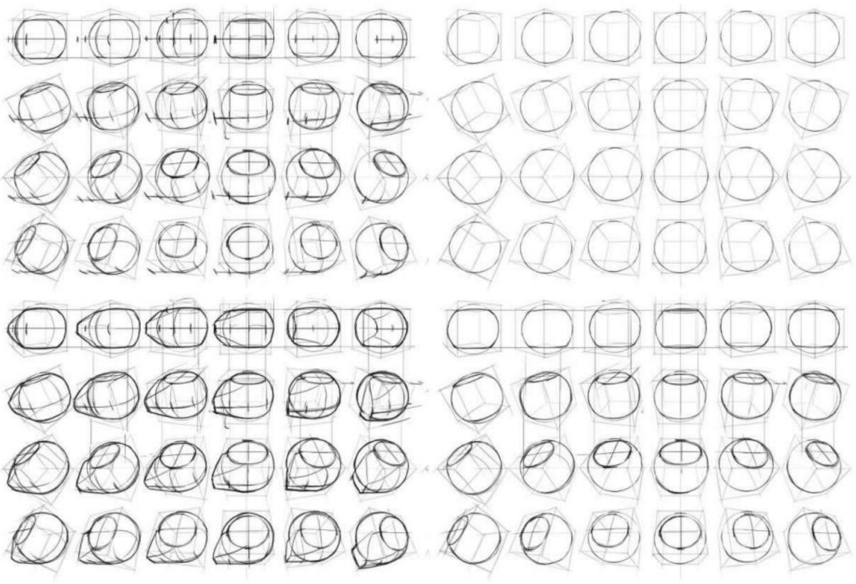
1.5 Dynamic performance of the head

To draw dynamic head movements from various angles, you must first understand the basic methods of head model construction. Here, we introduce one such method. The first step in the construction process is to establish a sense of cubes. The most common problem with drawing the head in general circles is unclear facial orientation. However, by "fitting" the circles into cubes, the perspective relationships and orientation of the face can be clearly defined. During the drawing process, pay attention to the size and proportion of the small circles on the side, accurately draw the perspective lines representing the three sections of the face, and finally connect the chin to complete the head model construction.



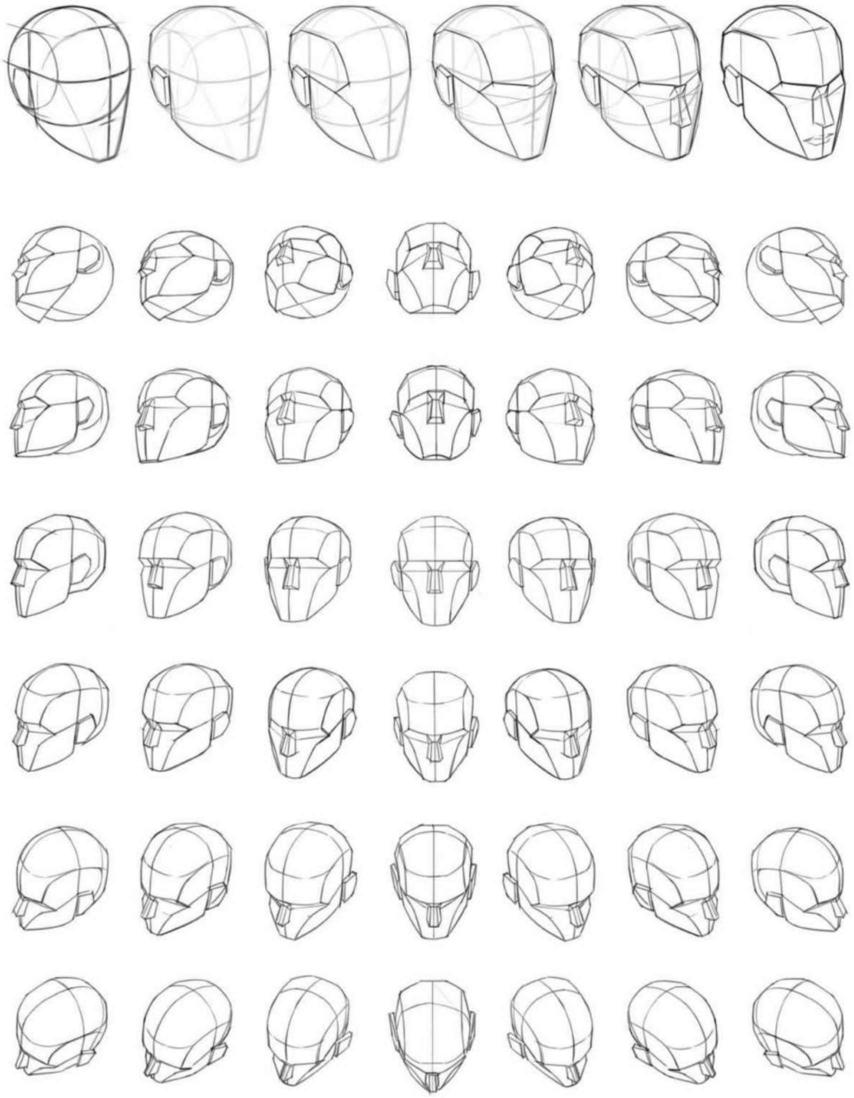


Having mastered the above drawing methods, you can use blocks at different angles to draw different angles. It's the head of the degree.



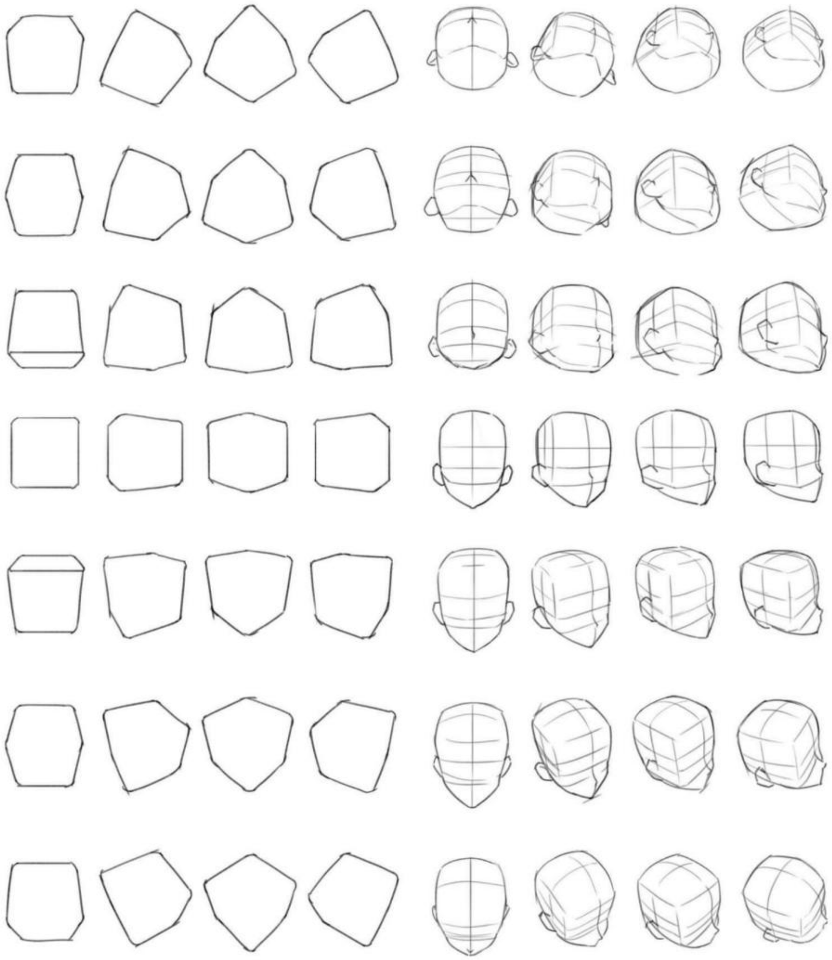
Based on the basic head model, the facial planes are further subdivided to obtain more specific head movements.

This allows for a deeper understanding of the dynamic changes in the head.



Besides some more conventional heads, when drawing the heads of anime-style characters, also...

Adjustments can be made to the basic head model, such as shortening the chin or enlarging the eyes.

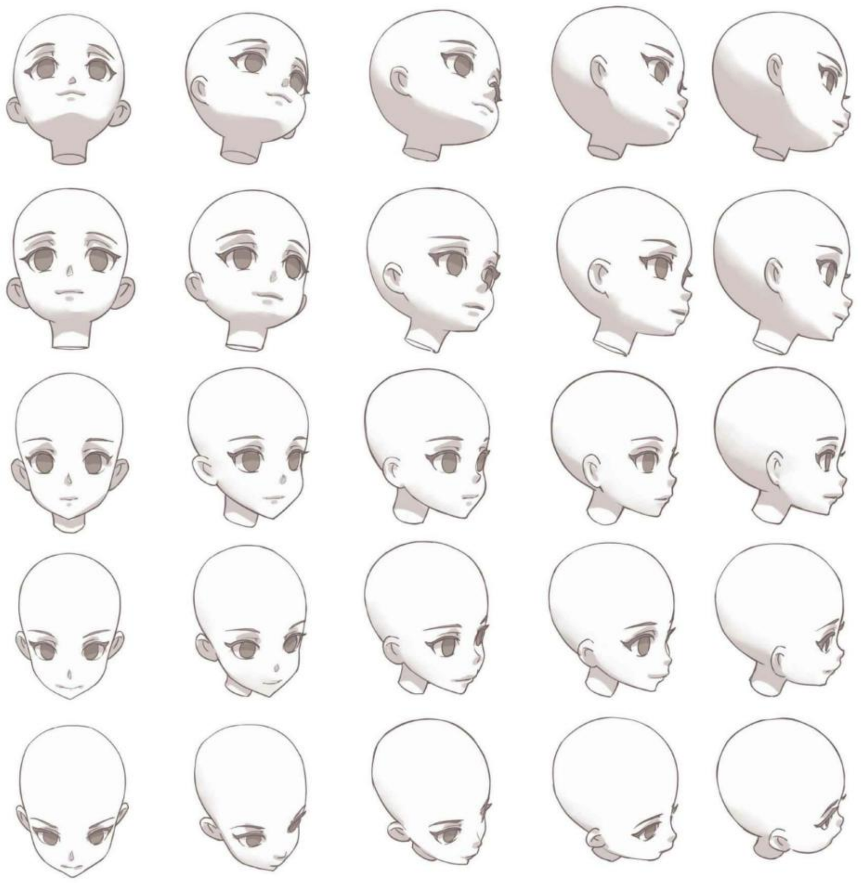


hint

For the head model template above, I used blocks to help with the initial shape, avoiding straight lines.

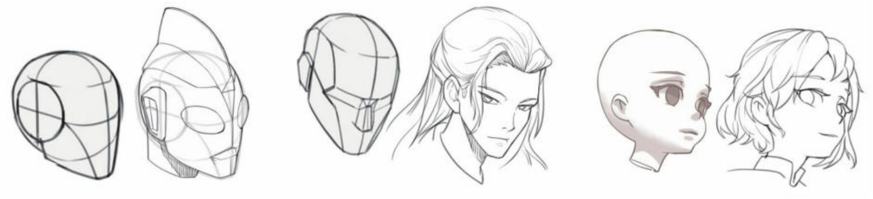
When using a rounded shape, it is difficult to accurately locate the perspective line of the facing surface.

The basic model of the head was further refined, and the facial features were depicted to obtain a more detailed head shape with different angles.



In specific drawing techniques, different head models can be applied to different art styles.

These three head models can basically meet the requirements for the head representation of characters in most current art styles.

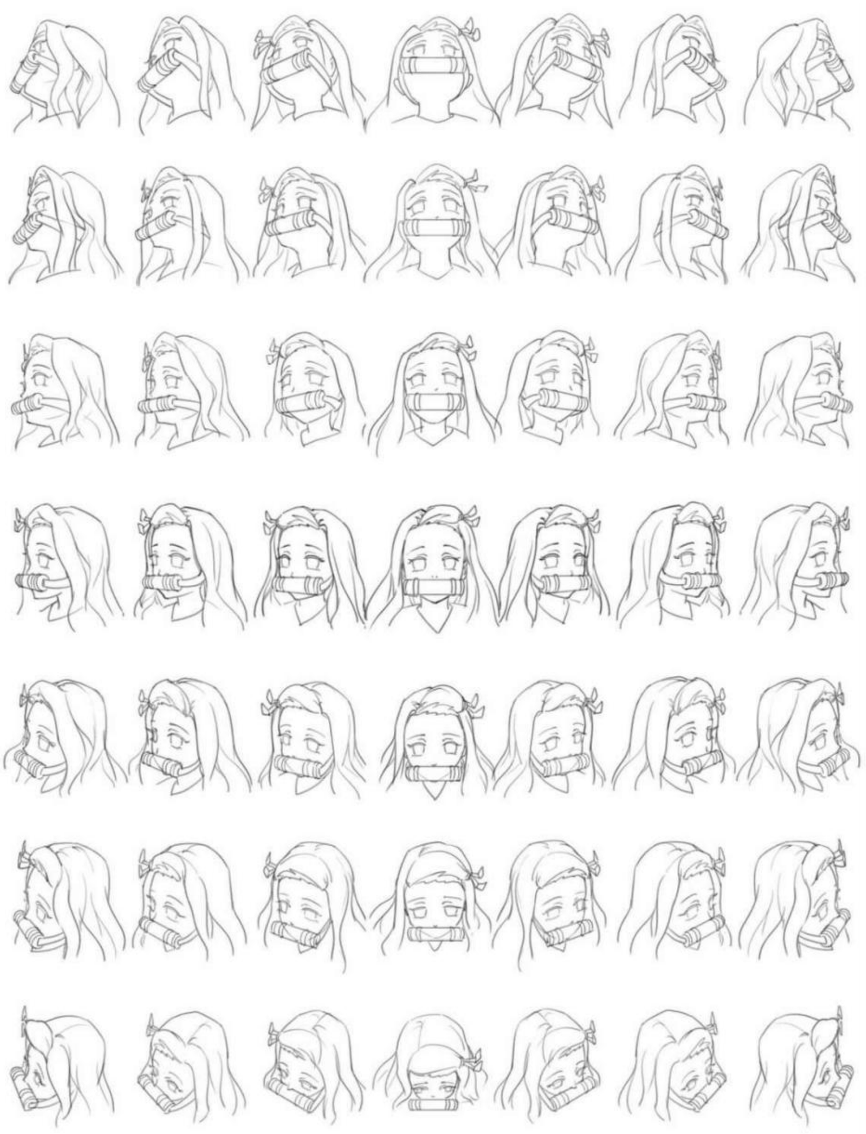


When applying the model, some modifications can be made as needed, such as to the eyes and lower abdomen.

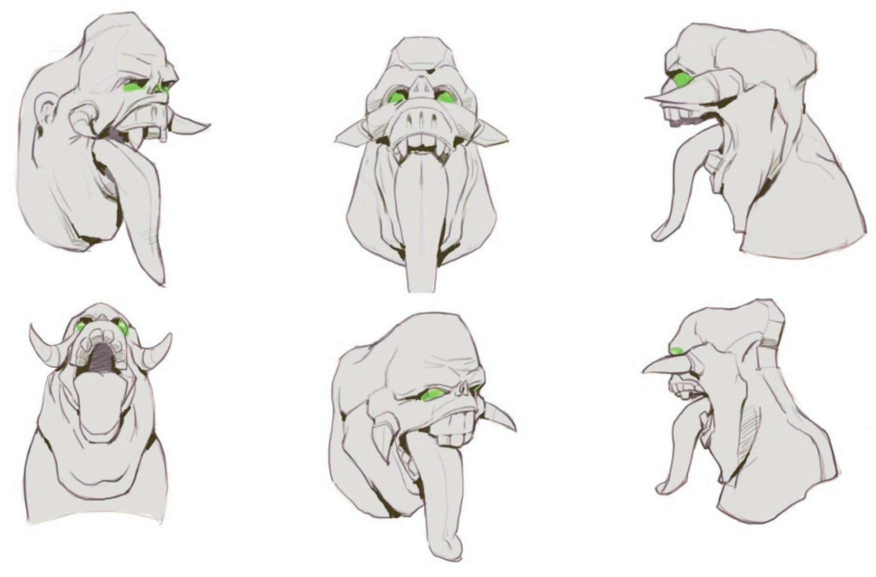
Personalized sculpting of important areas such as the chin and nose.

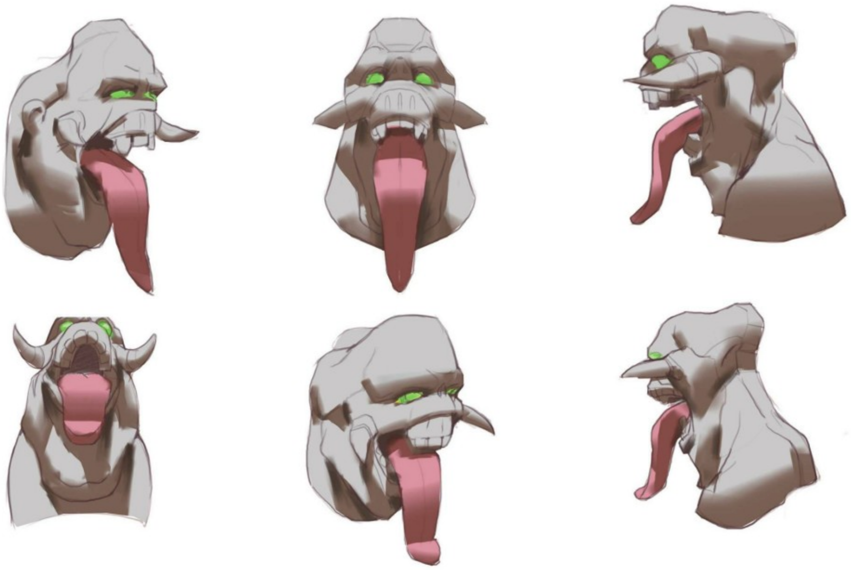
Once you've decided on your preferred style, you can practice drawing character heads from different angles.

department.



The same method can be used when drawing the heads of animals.



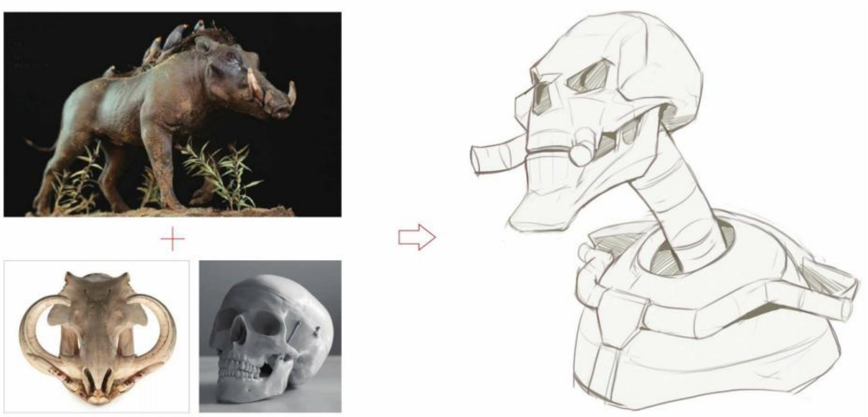


More specialized training

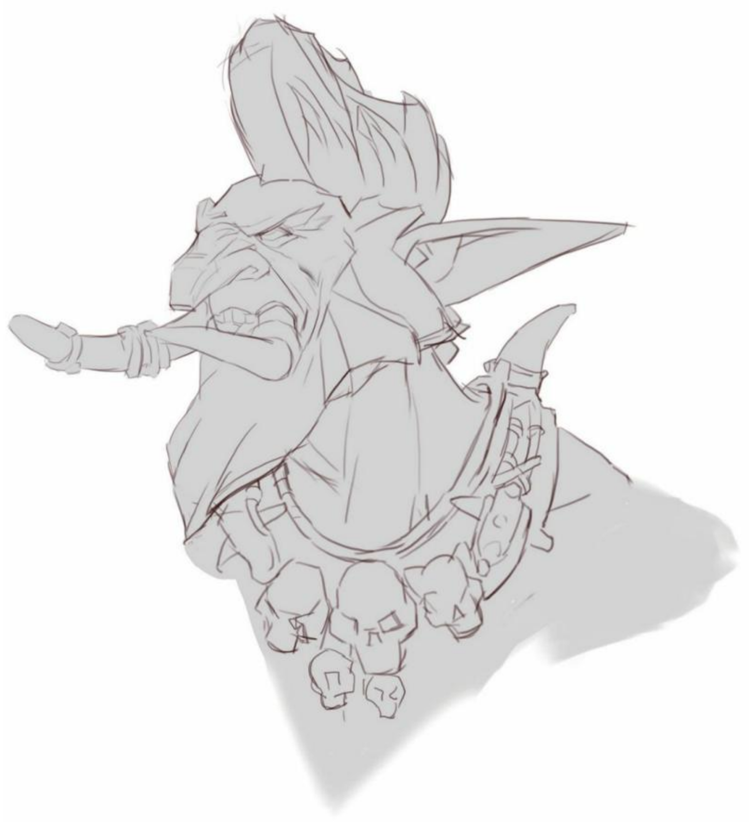
This exercise demonstrates the flow of a troll design from concept to completion.

Approximately.

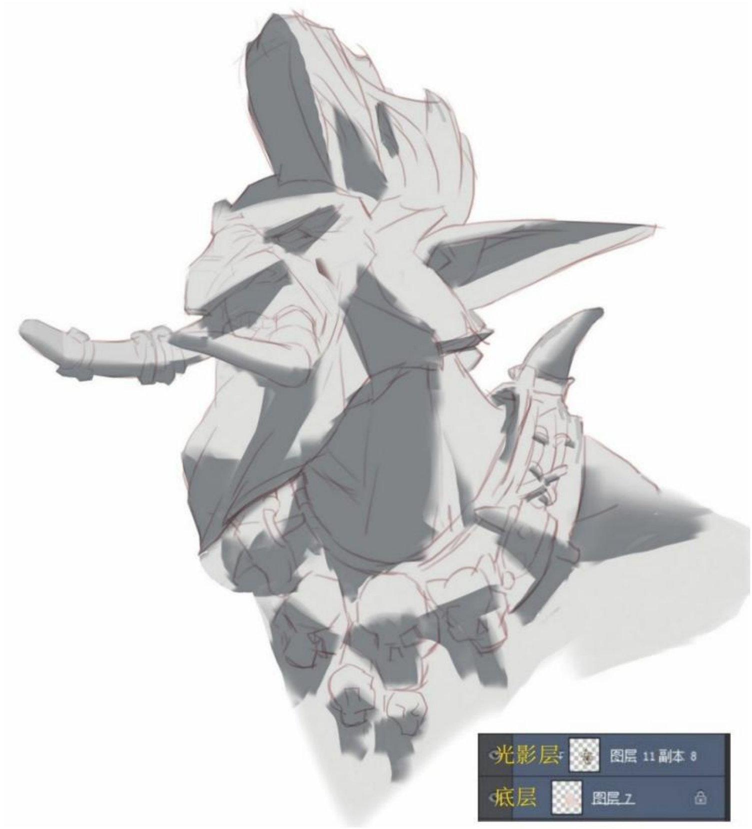
01. Set the character's head skeleton (the troll's skull is a combination of the warthog and human skulls).



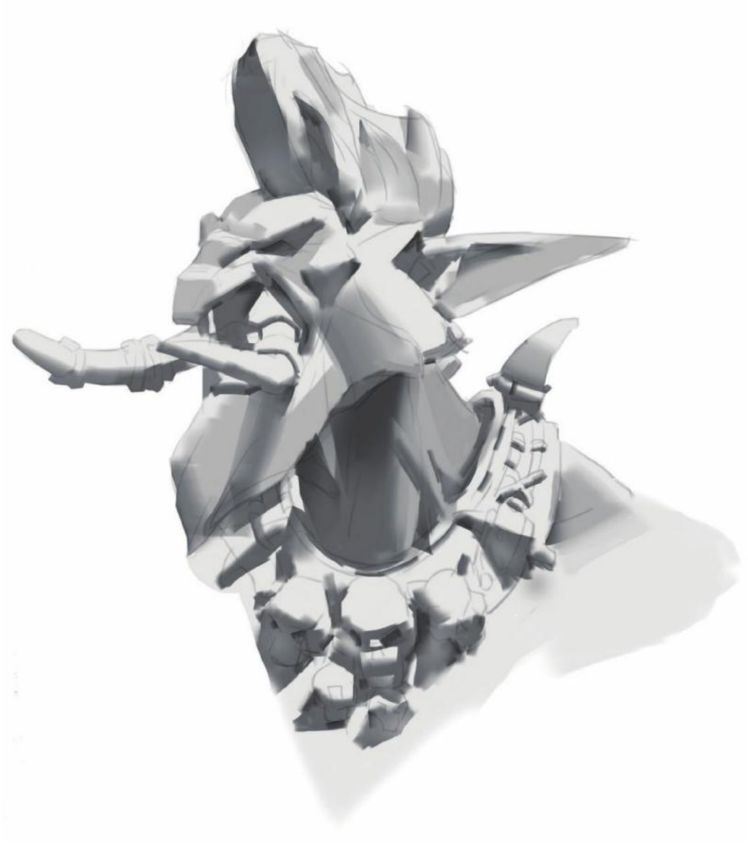
02 Draw the troll's head shape based on the skeleton.



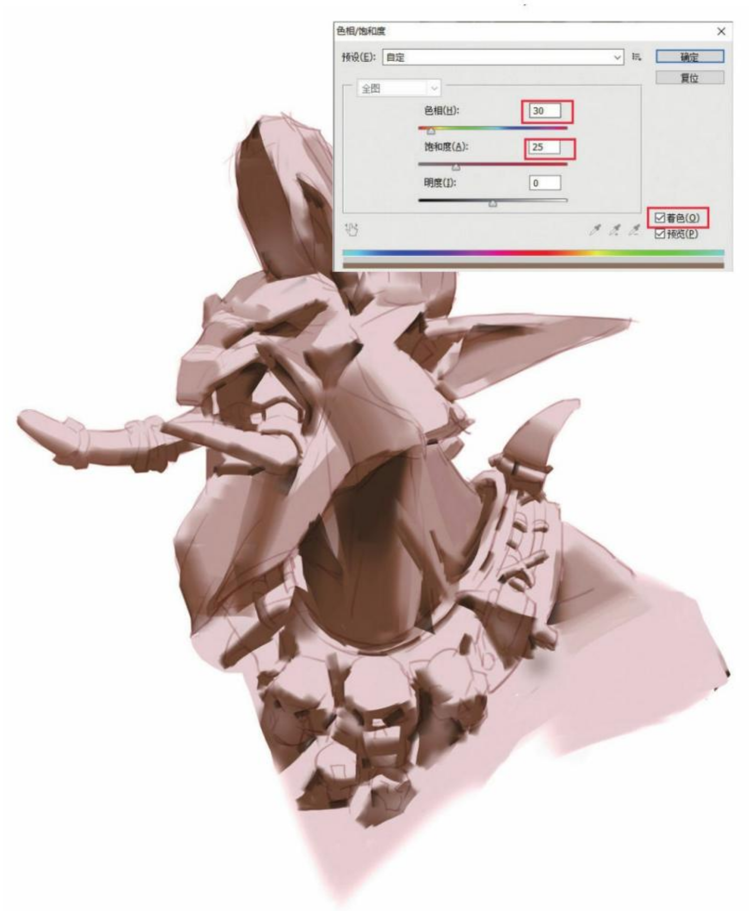
03. Set the light source. Set the light source to the upper right corner. Based on the light source, use black and white to roughly lay out the light and shadow tones for the character. Note that you need to paint on two layers: one is the bottom layer, and the other is the light and shadow layer.



04. Based on the structure, refine the character's lighting structure to create three levels of tone: black, white, and gray (the changes in lighting tone will be explained in detail in the last chapter of this book).



05 Select the coloring layer, open the "Hue/Saturation" property panel, check the "Colorize" option, and adjust the hue and saturation of the coloring layer (here, adjust the hue to a warmer color, but do not make the saturation too high) to create a contrast effect between warm and cool hues in the image.


色相/饱和度
确定
复位
全图

预设(E): 自定

色相(H): 30

饱和度(A): 25

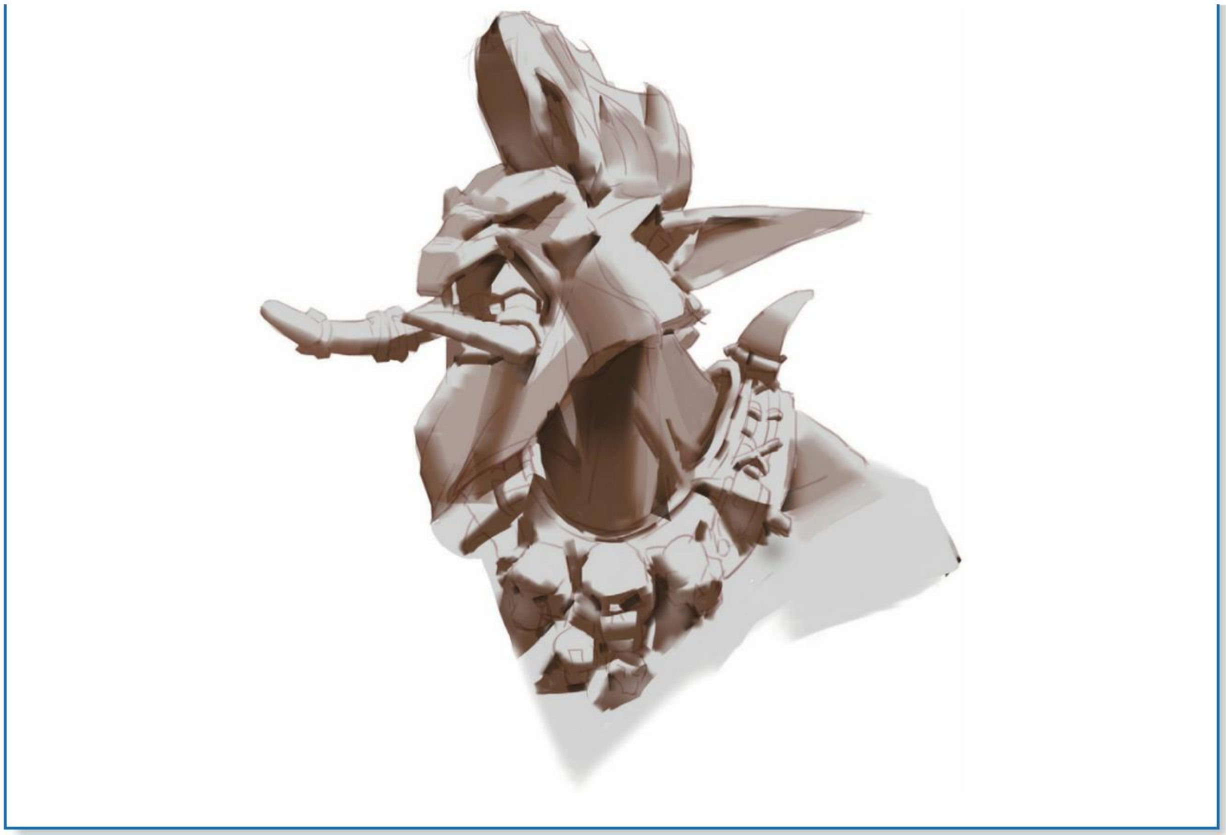
明度(I): 0

☑ 着色(O)

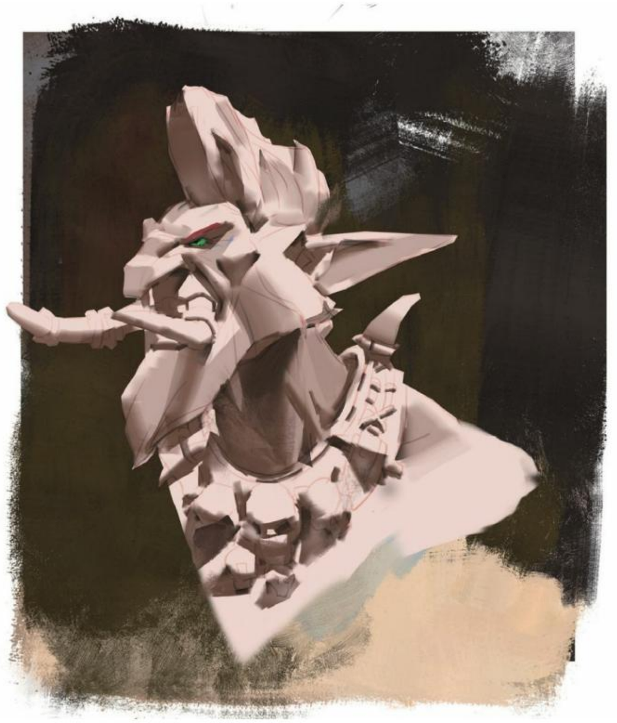
☑ 预览(P)

hint

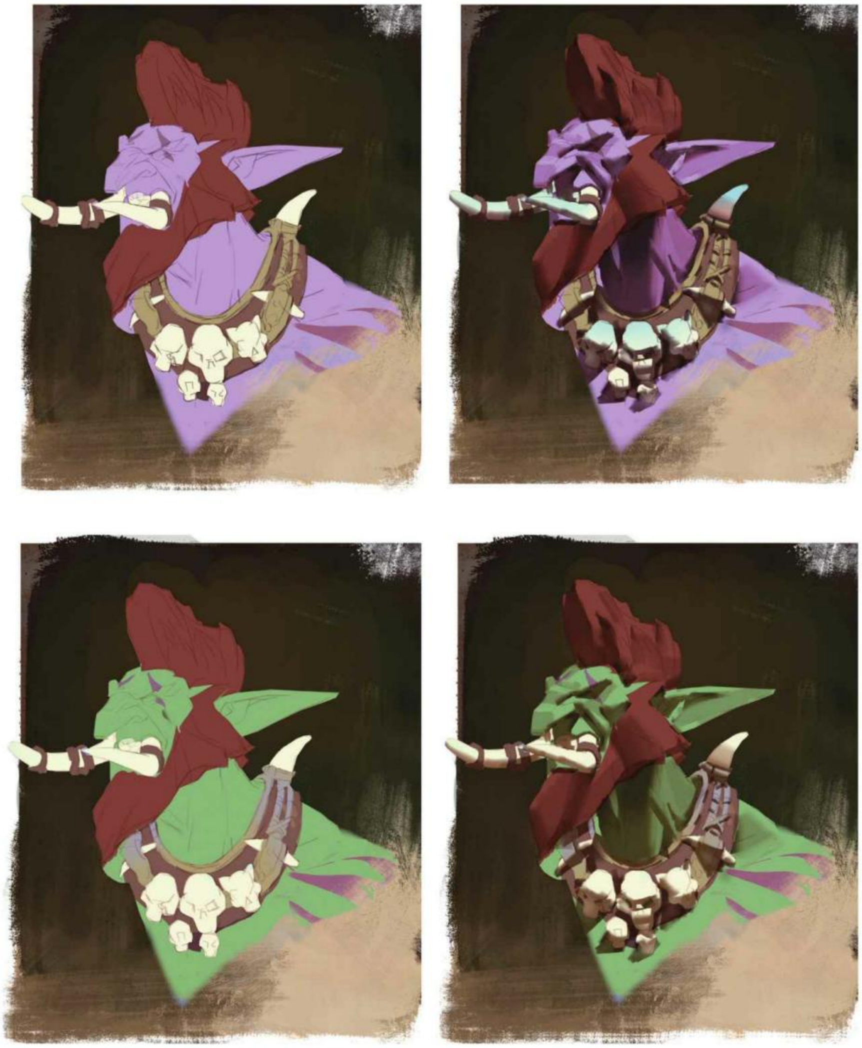
Here you can also adjust the brightness and hue of the underlying layer.



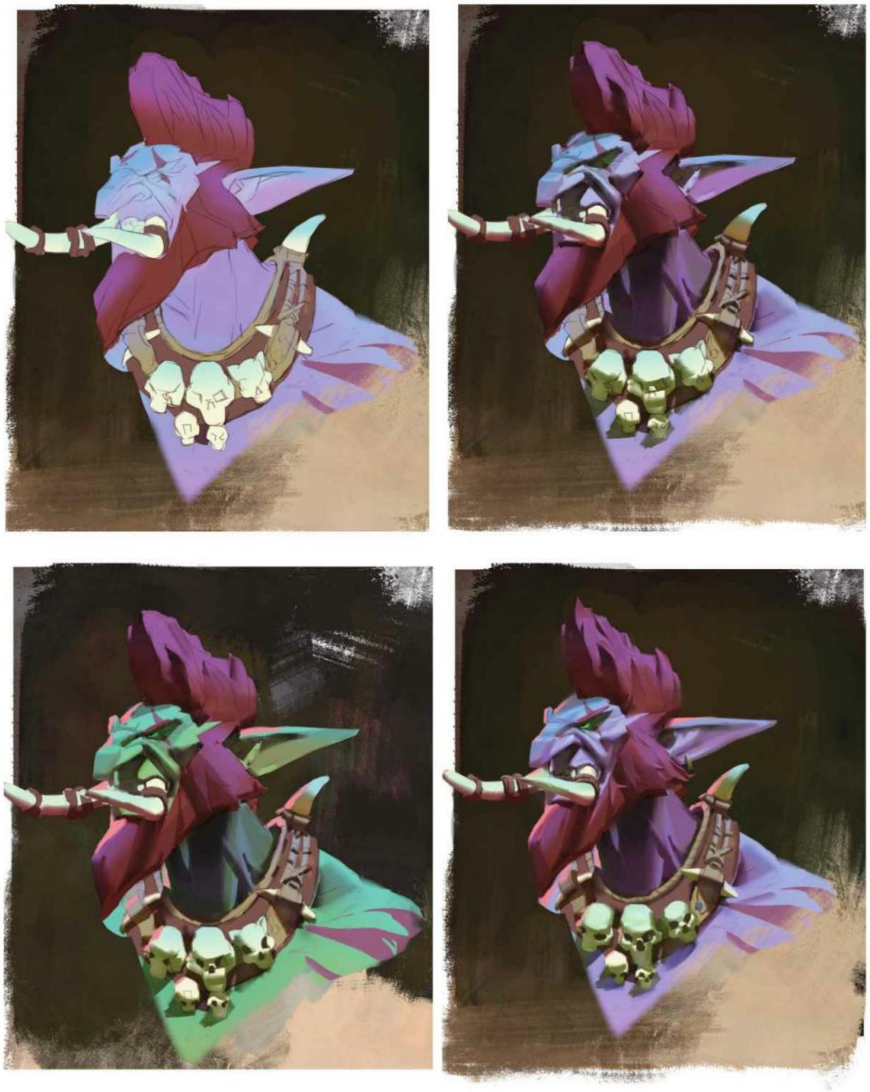
06. Fill the background color for the character.



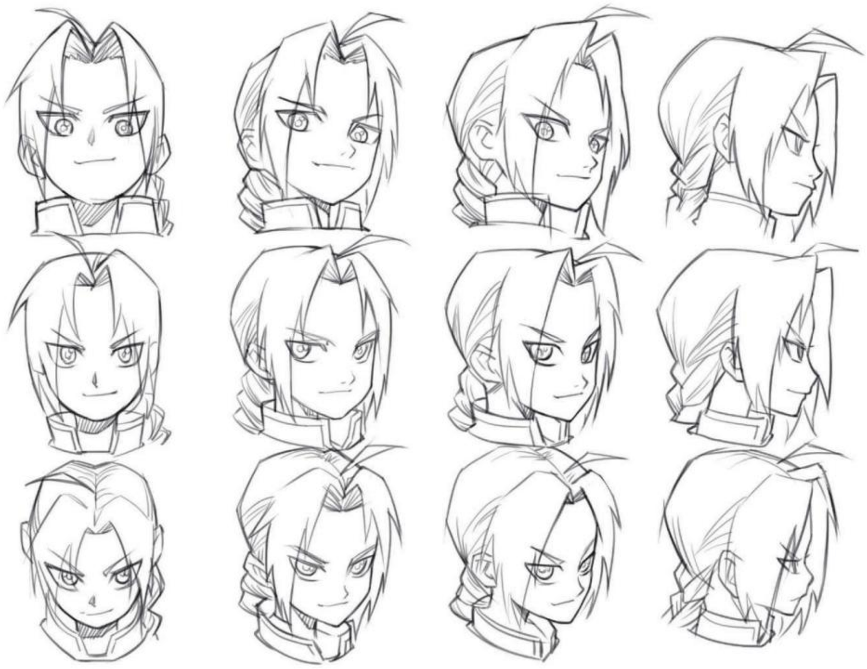
07. Create a new coloring layer (coloring layer), and fill it with color according to the character's design requirements. The colors can be changed arbitrarily. Then, open the lighting and shadow layers to check the visual effect.



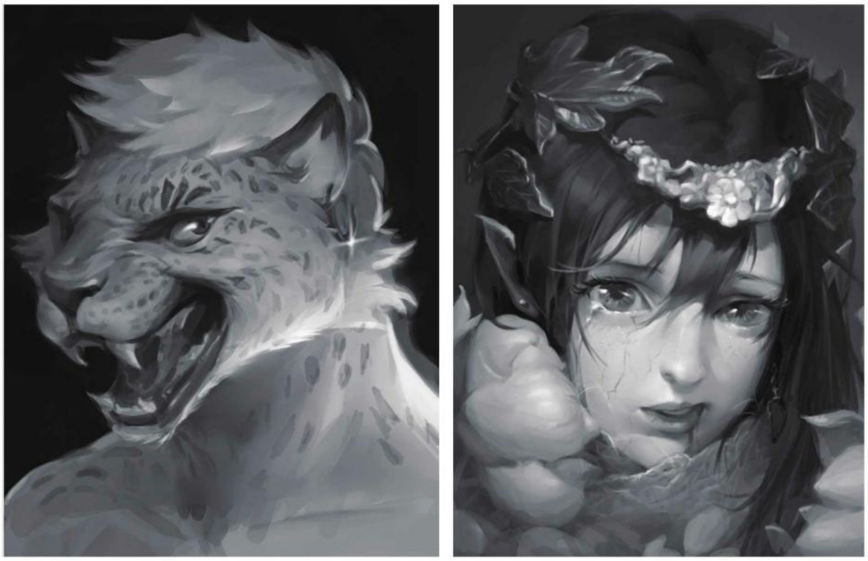
08 After determining the colors, add a bluish skylight layer above the coloring layer, and further enrich the colors of the image in this layer, finally refining the details.



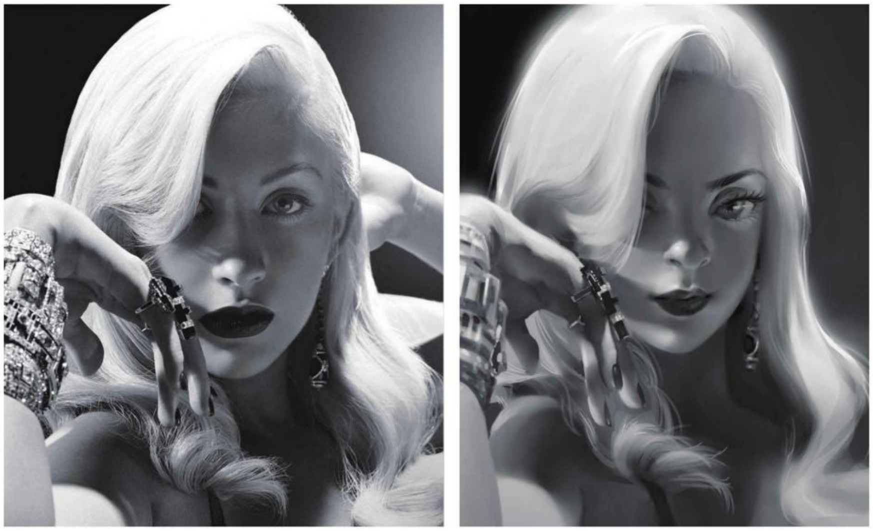
Do a set of dynamic head rotation exercises.



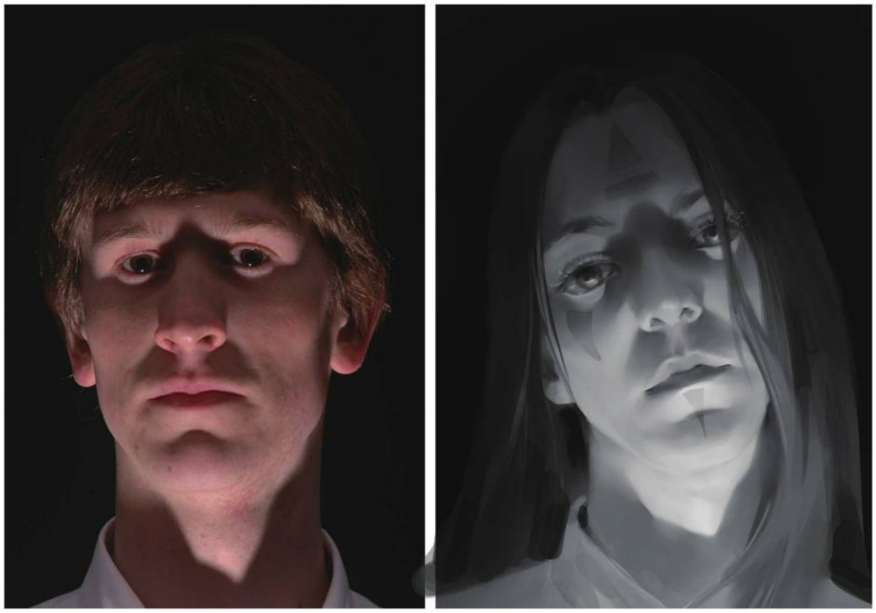
Create a set of black and white portrait exercises. This exercise can cultivate learners' ability to control the relationships in sketching. When practicing, you can find inspiration from photos and change the appearance of the people in the photos to better meet the aesthetic requirements of industries such as games and animation.

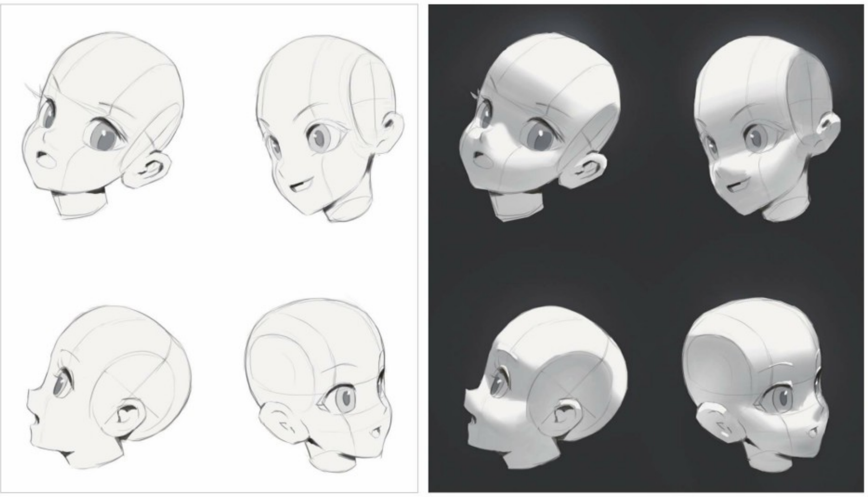


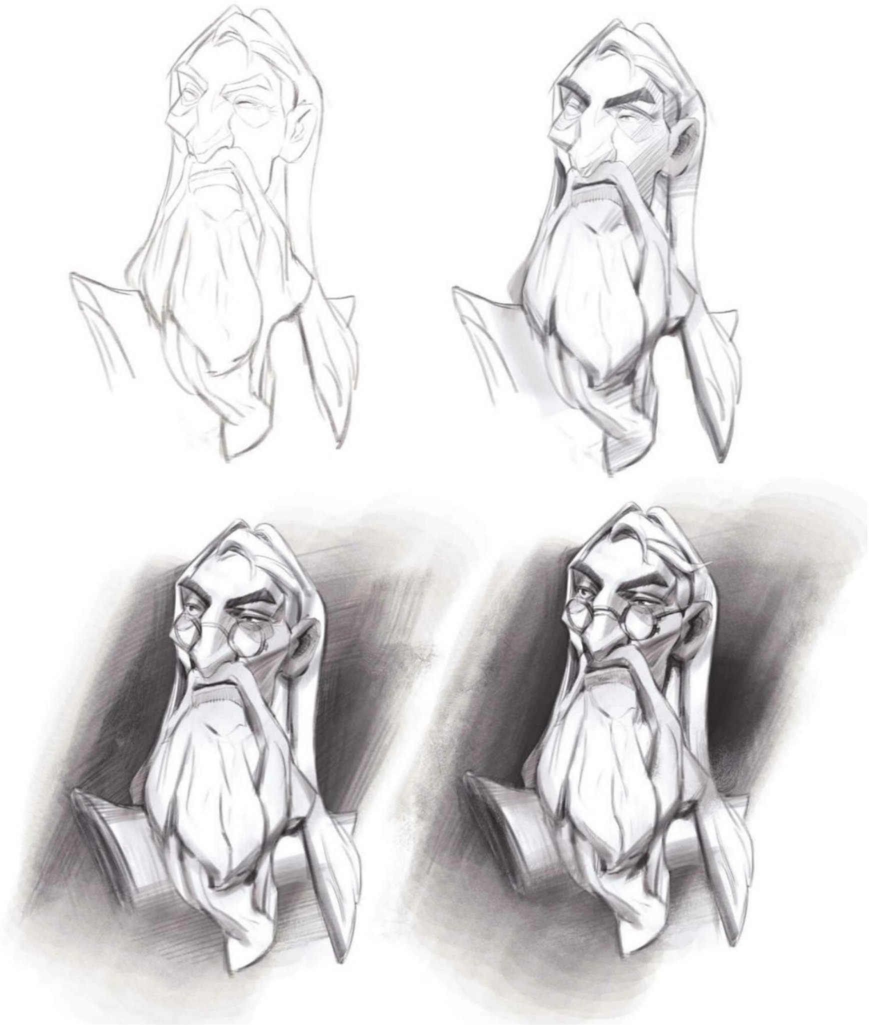
Slightly alter the appearance of the people in the photo, such as facial features and the direction in which the head is turned.

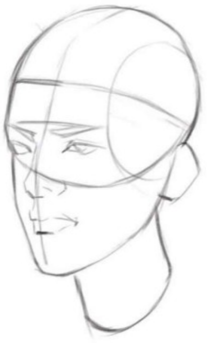


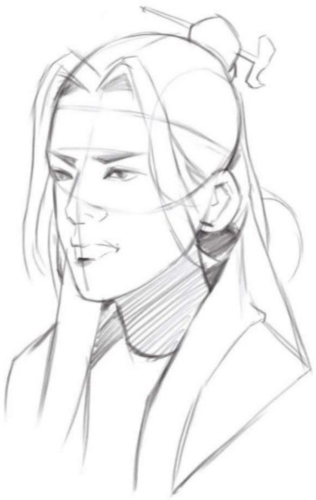
Do a set of head lighting exercises.

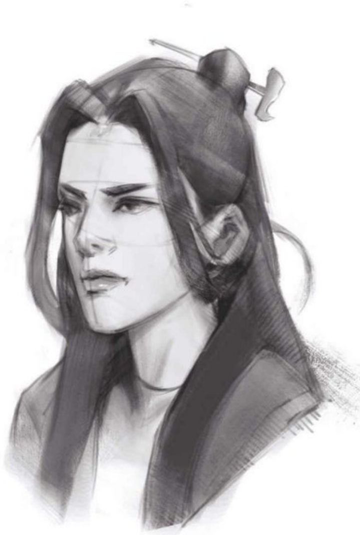


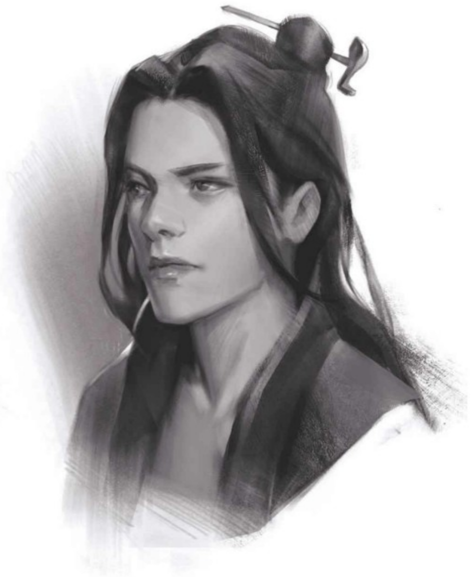


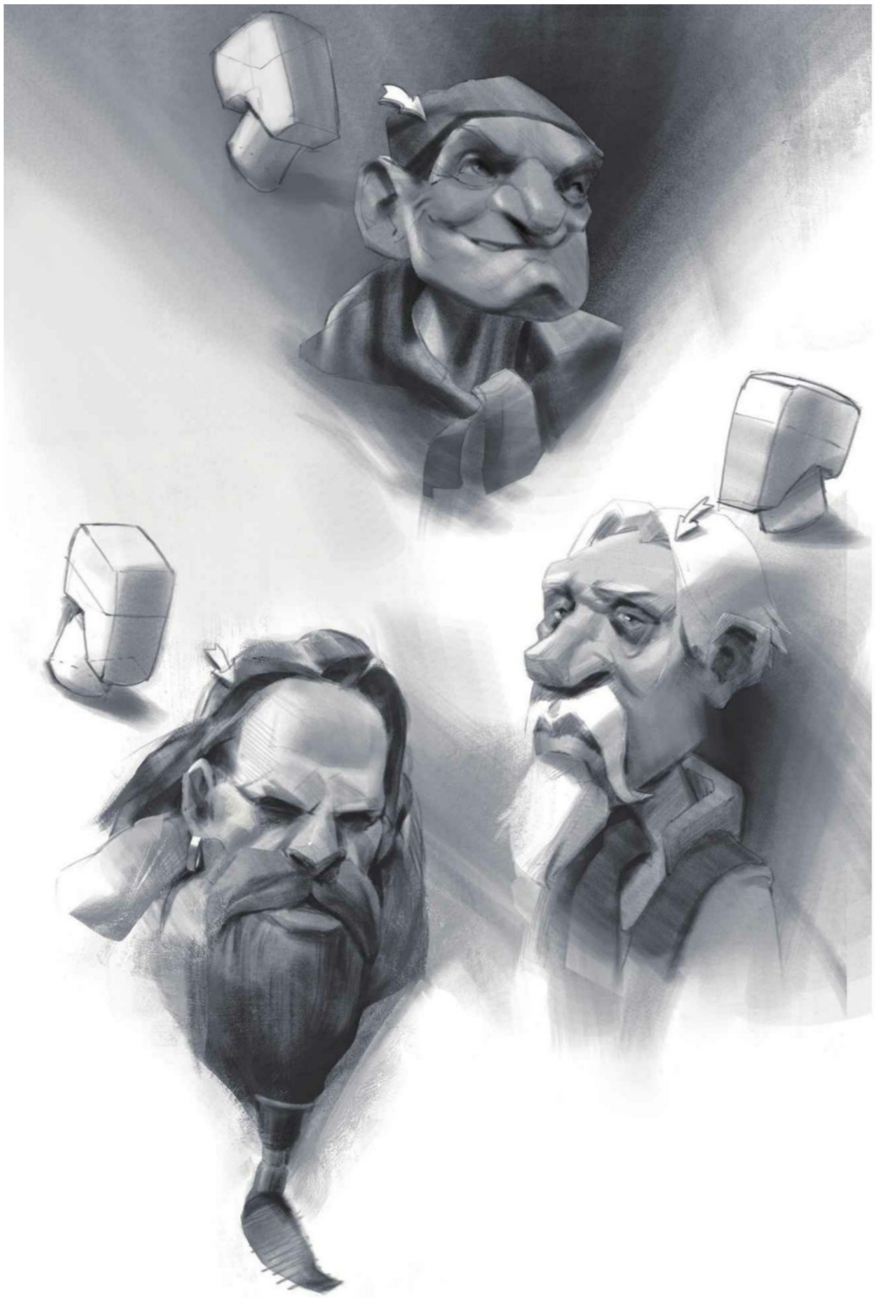


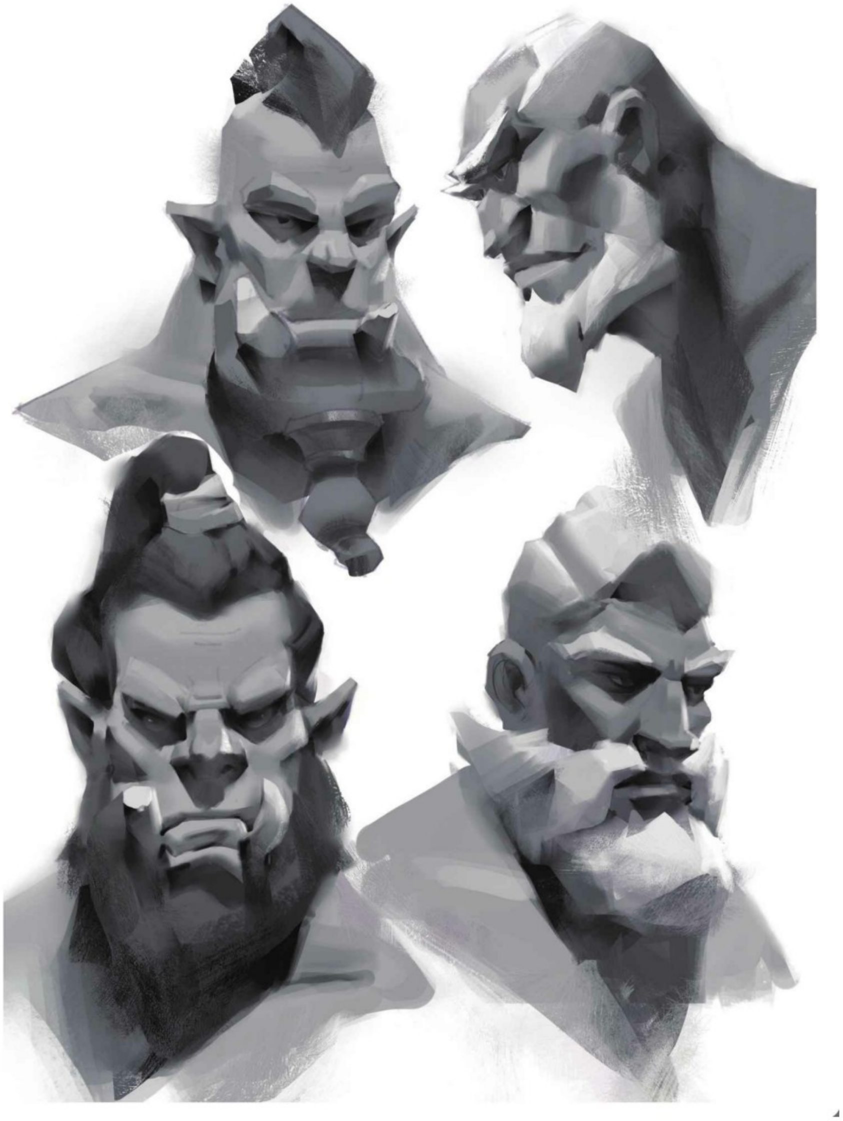


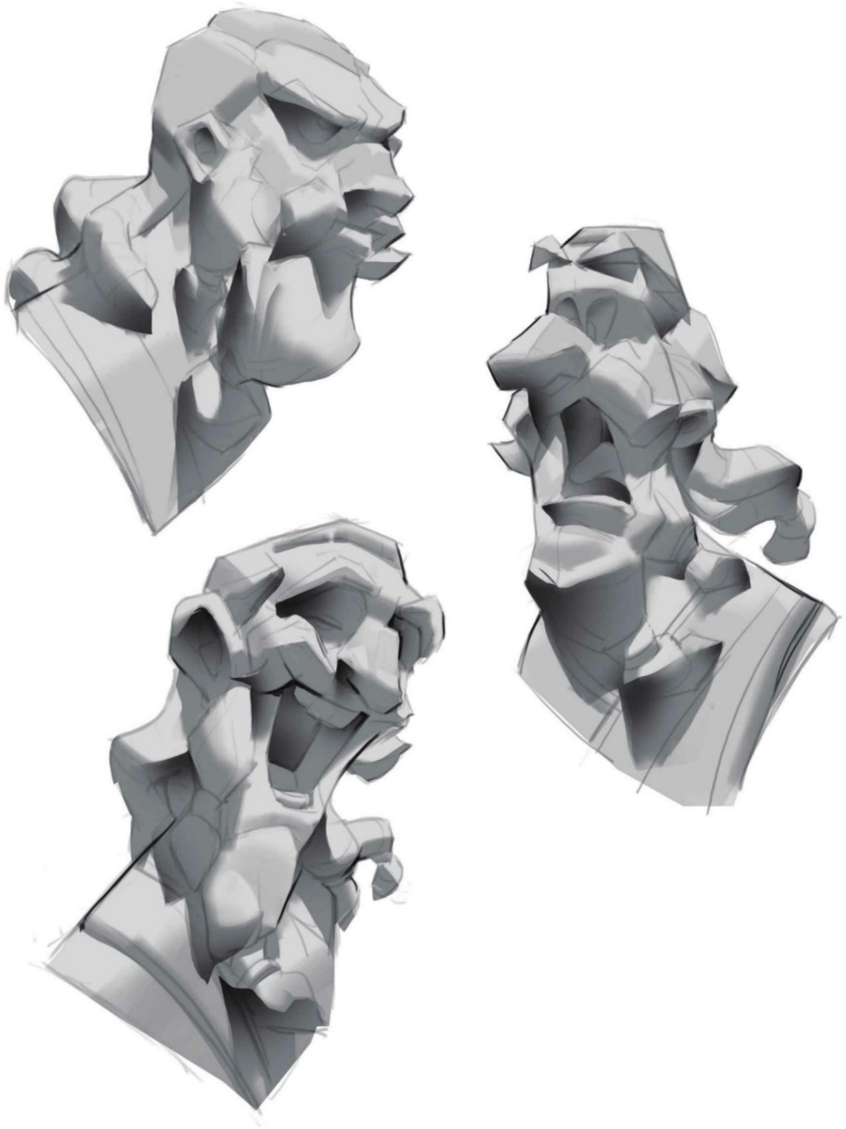


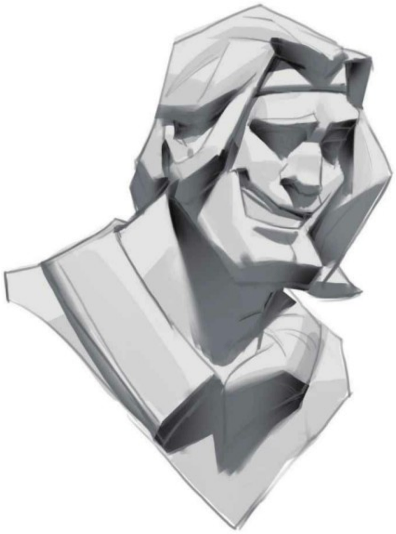


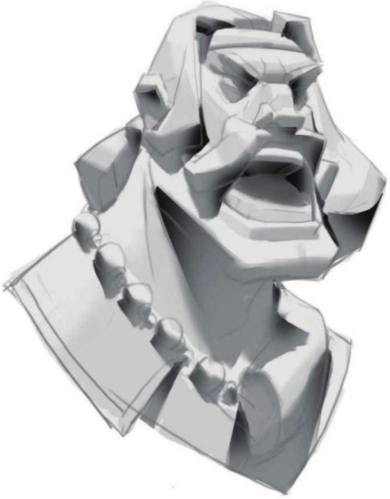


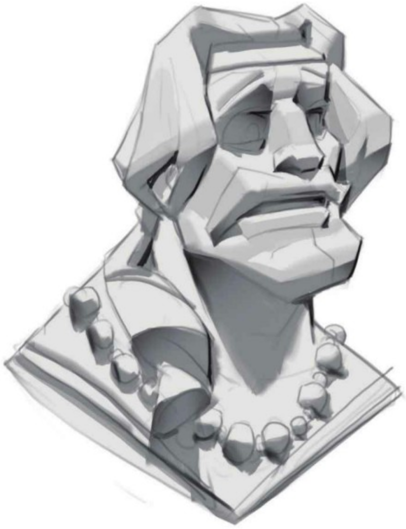


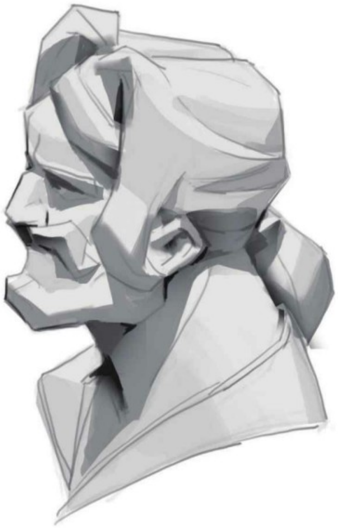


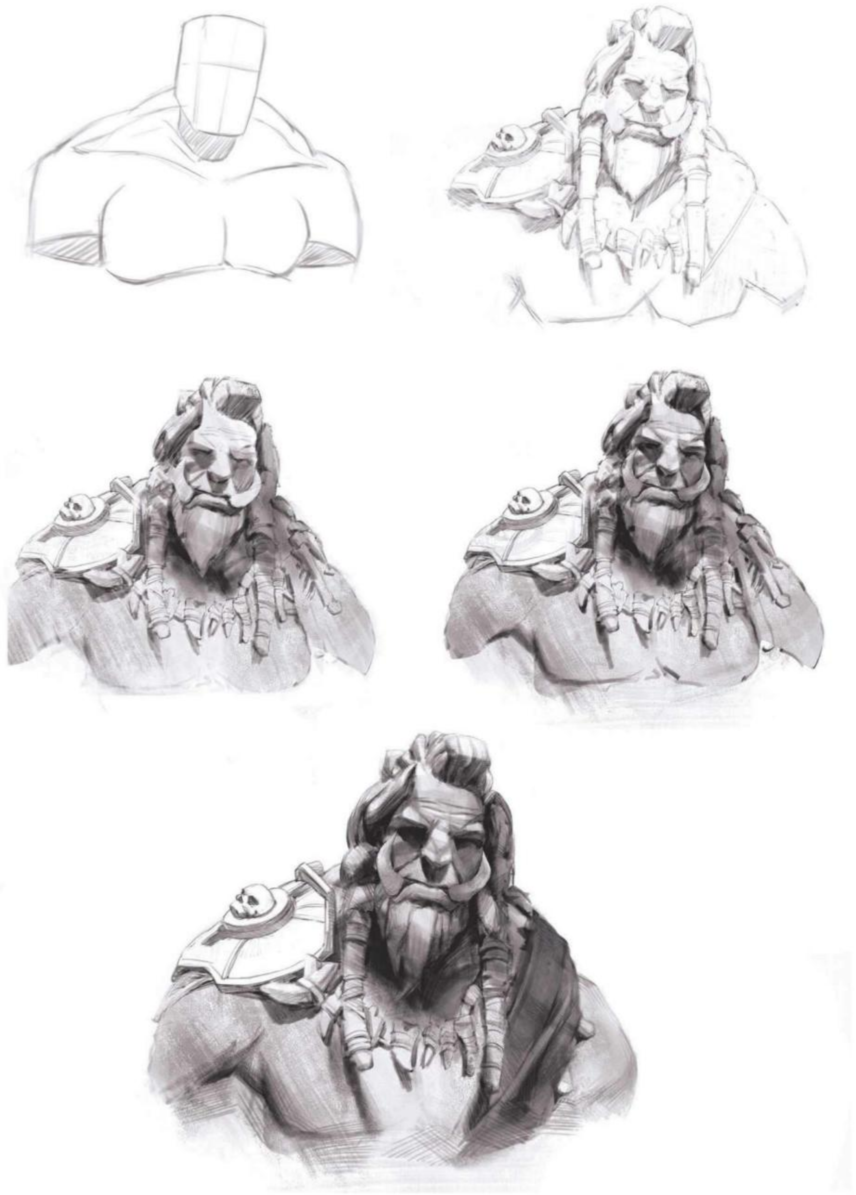




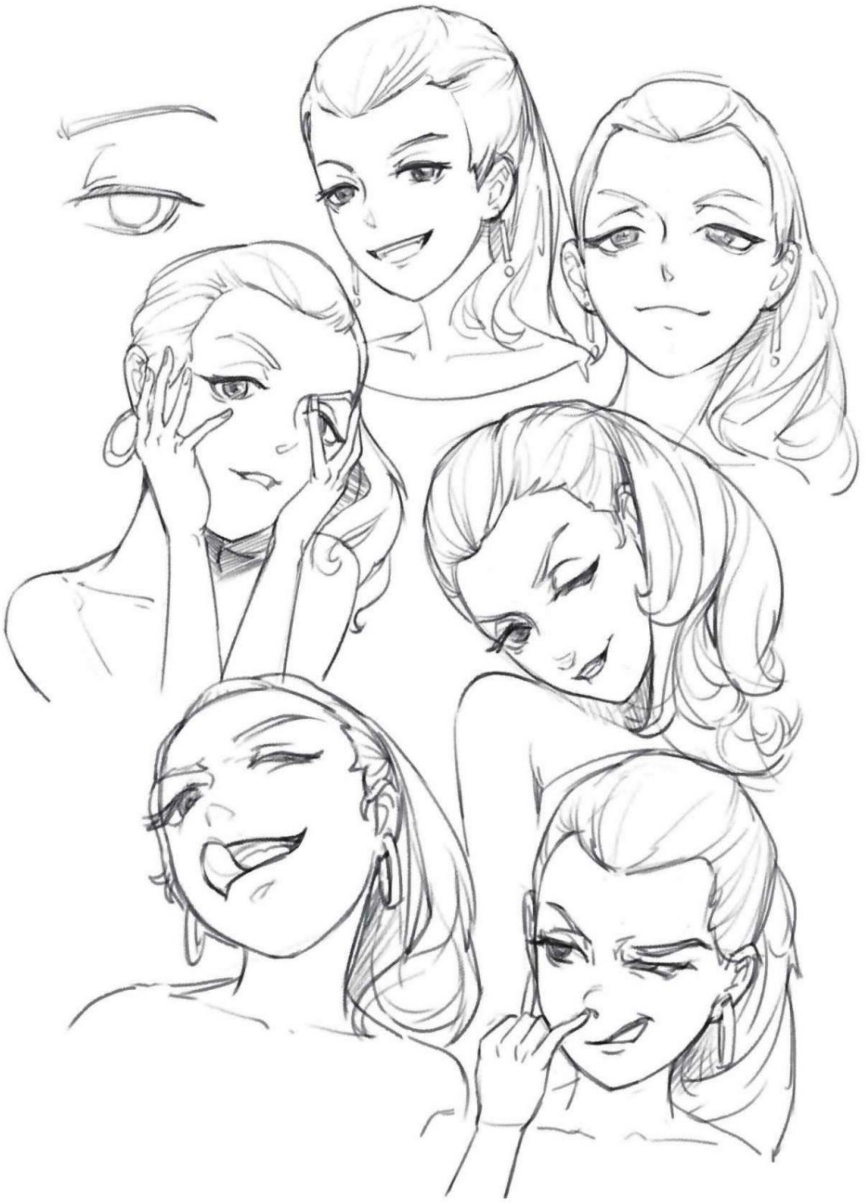


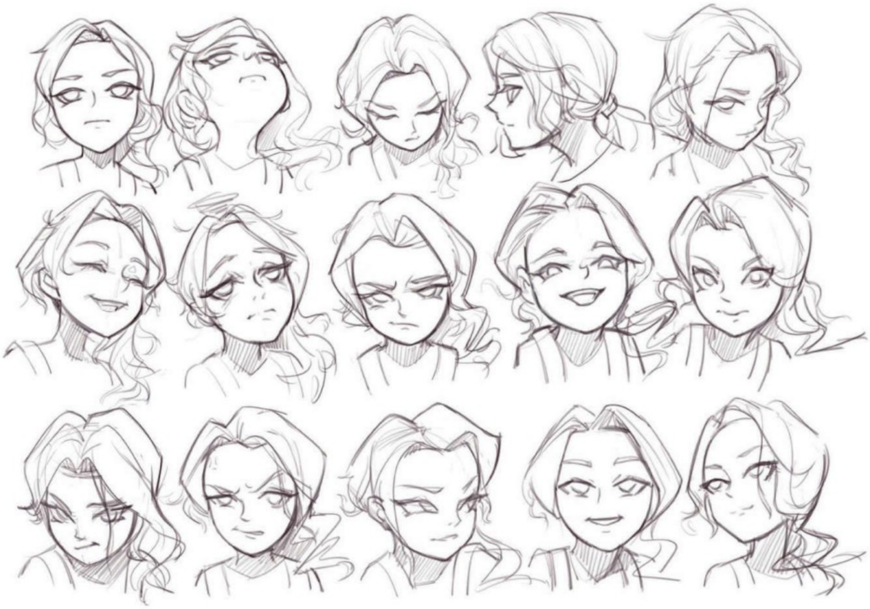


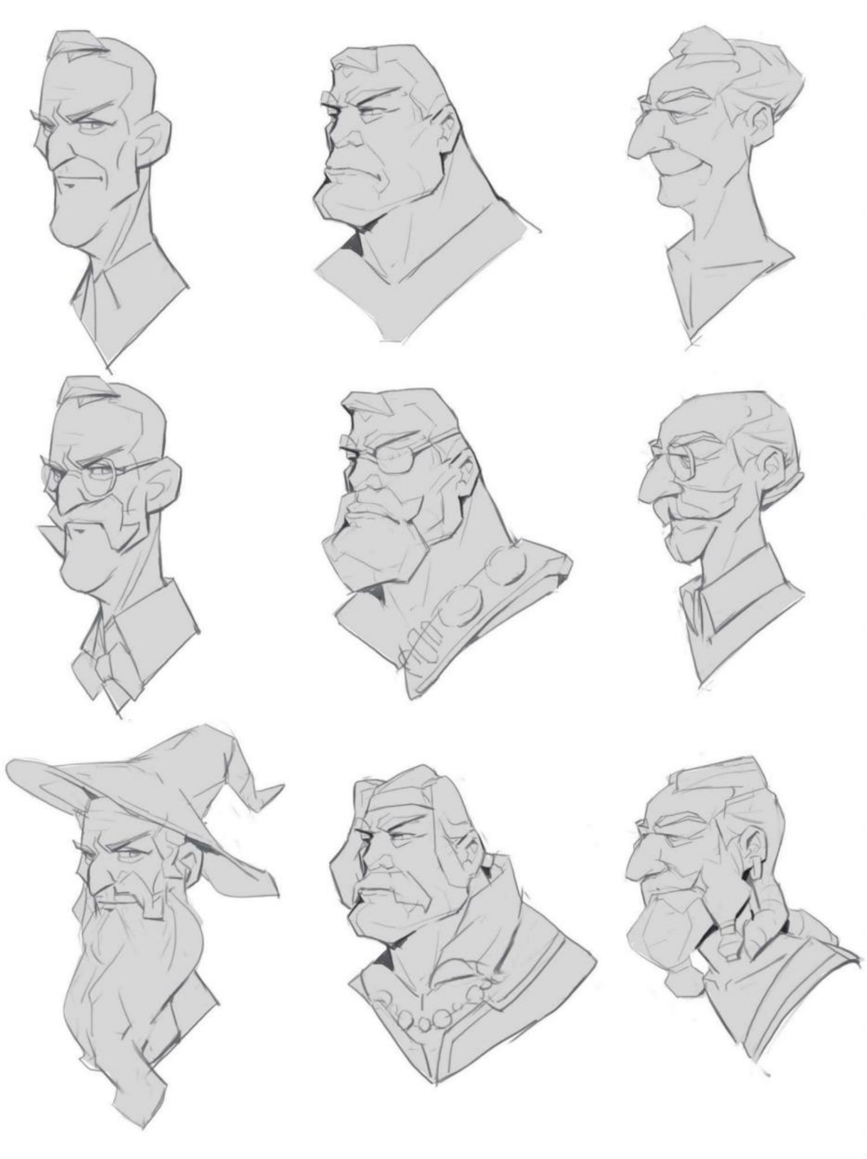




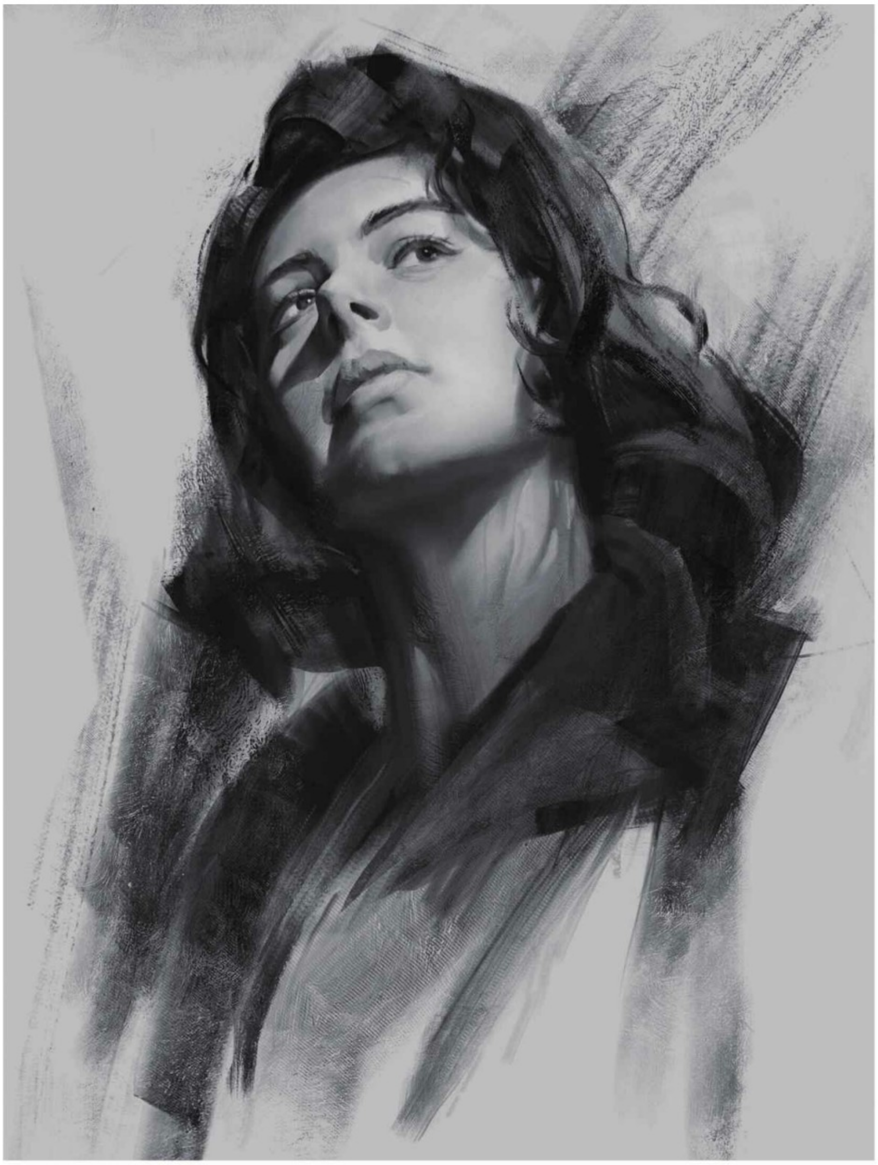
Do a set of facial expression exercises.

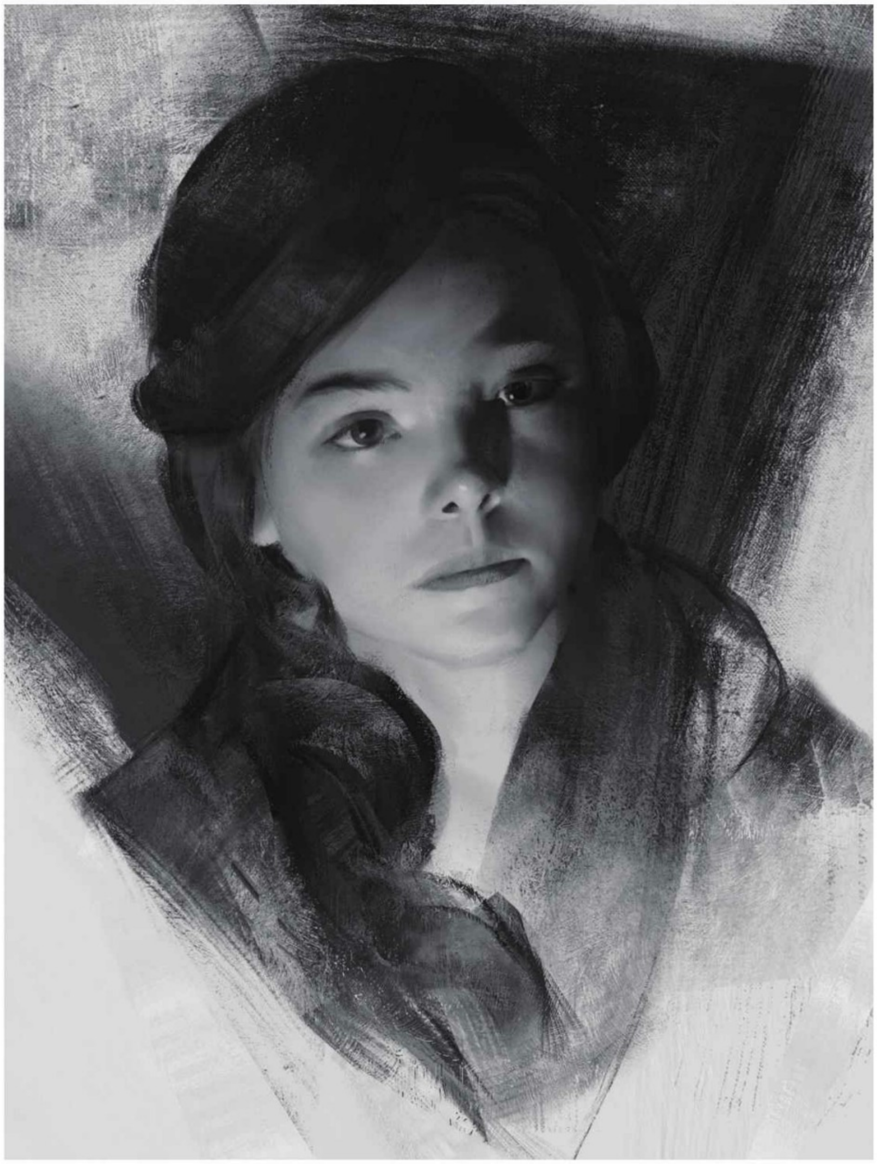


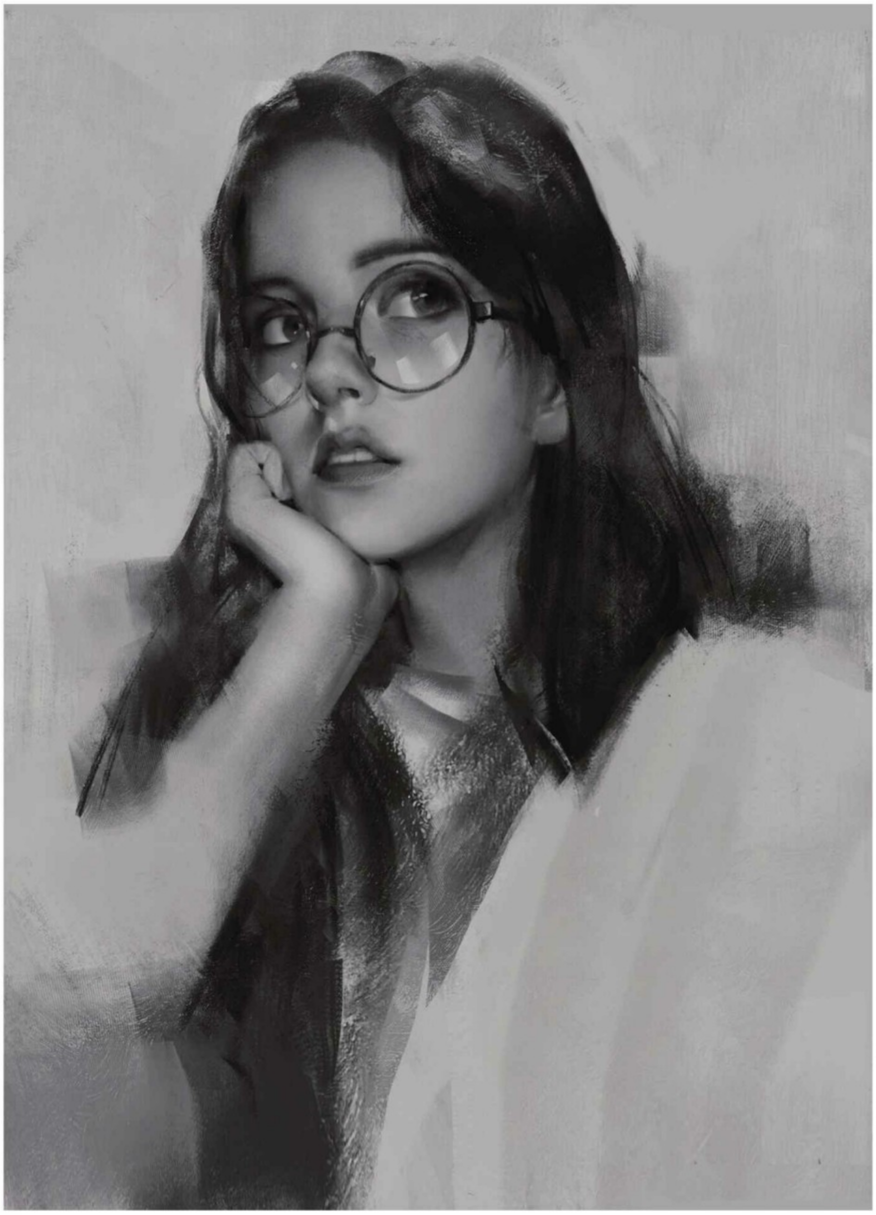


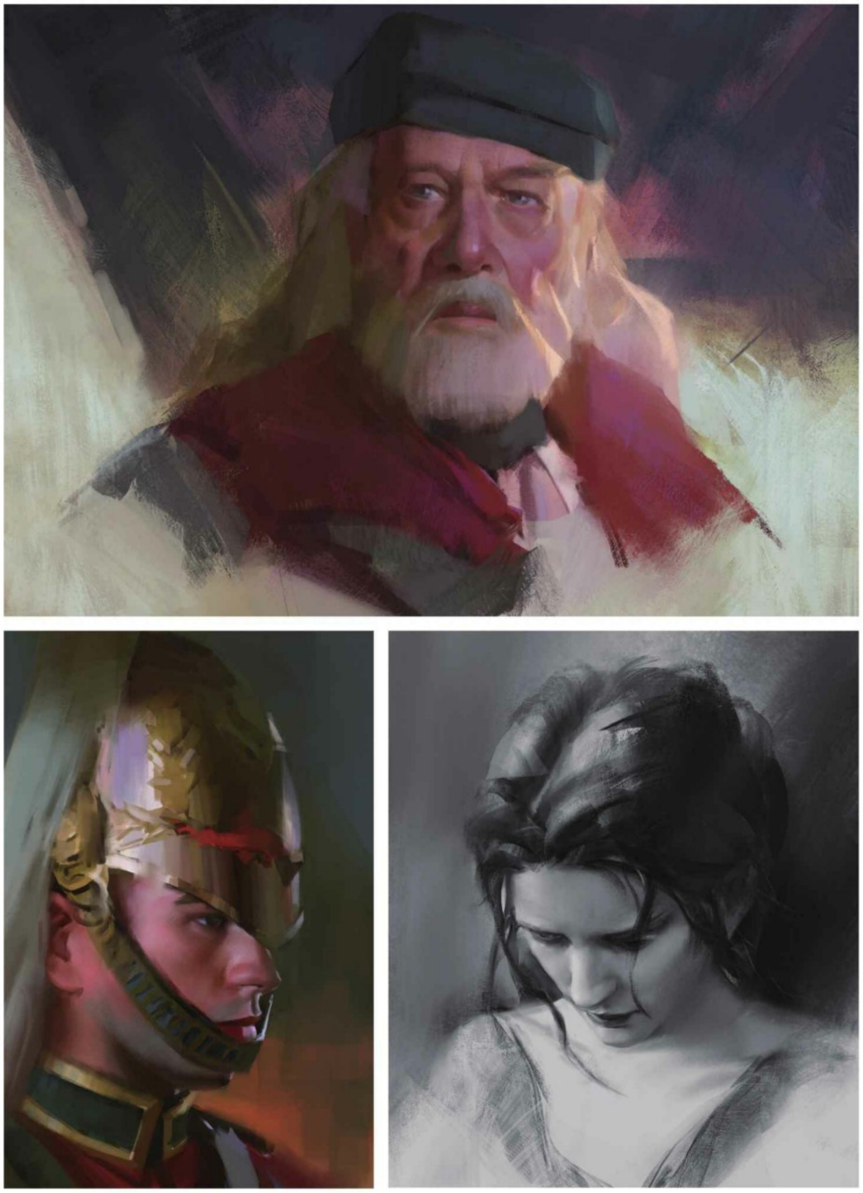


Do a set of photo copying exercises.









Chapter 2 Trunk-Specific Training

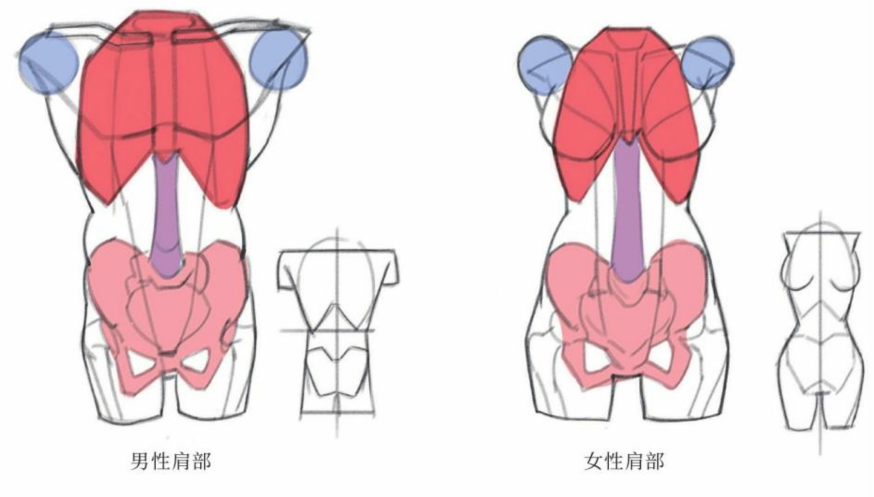
exist In the process of learning to draw the human body, the twisting of the torso often affects the overall aesthetics of the figure. A comfortable and reasonable torso twisting motion makes human movement more natural. This chapter will explain in detail the proportional structure of the torso, spatial awareness of the thoracic cavity and pelvis, and the bones and muscles of the torso. At the same time, this chapter also analyzes various states of torso twisting, and explains in depth the changes in bones and muscles caused by different twisting states.

2.1 Trunk Proportion Structure

For studying the human body, mastering the proportions and structure of the torso is crucial; without understanding the torso's structure, the human figure drawn is often inaccurate.

2.1.1 Proportions of the torso

There are three main differences in the torso proportions between men and women: First, men's ribcages are wider than women's. Second, women's pelvises are relatively wider than men's. These two factors result in men having an inverted triangle body shape, while women have an upright triangle body shape. Third, men's joint balls are slightly larger and more widely distributed than women's, which results in men's shoulders being much wider than women's shoulders.

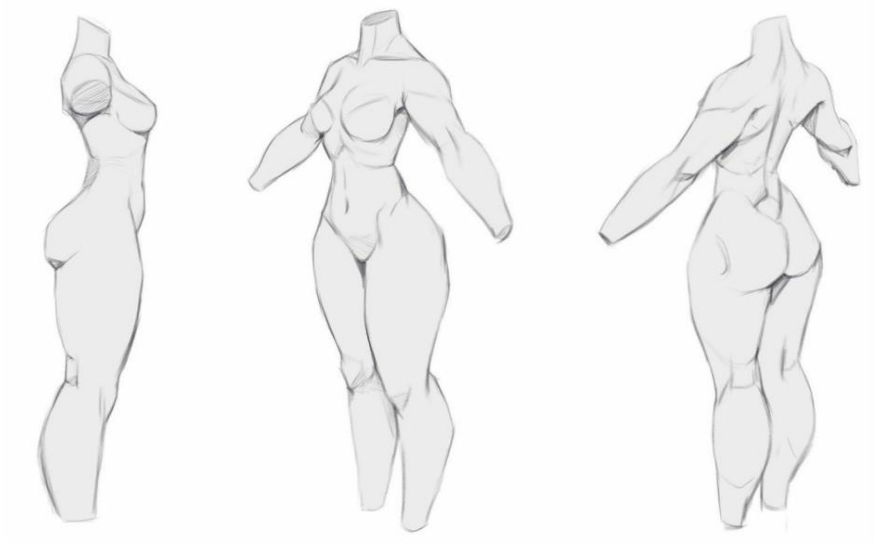


2.1.2 Structure of the torso

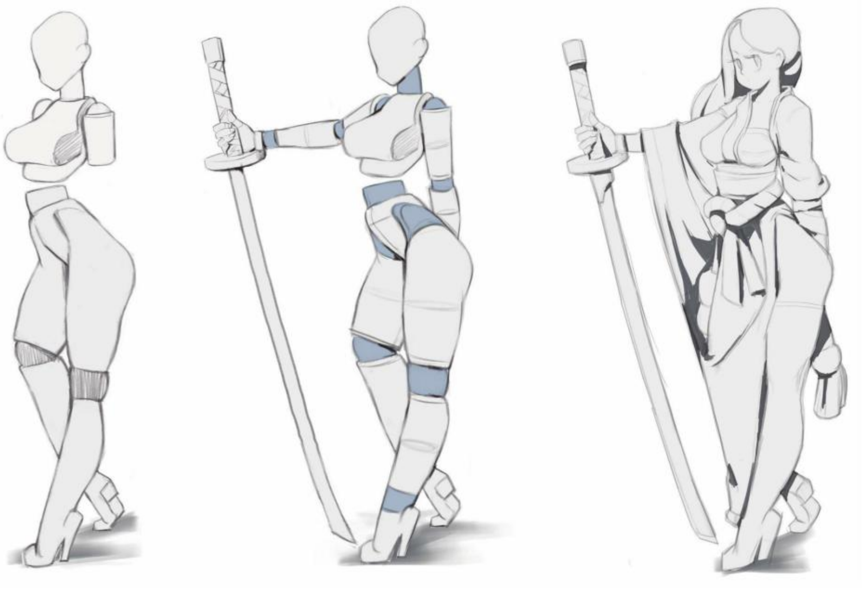
You can start by simplifying the structure of the torso into simple geometric shapes to understand it, and carefully observe each part.

The connection relationships between

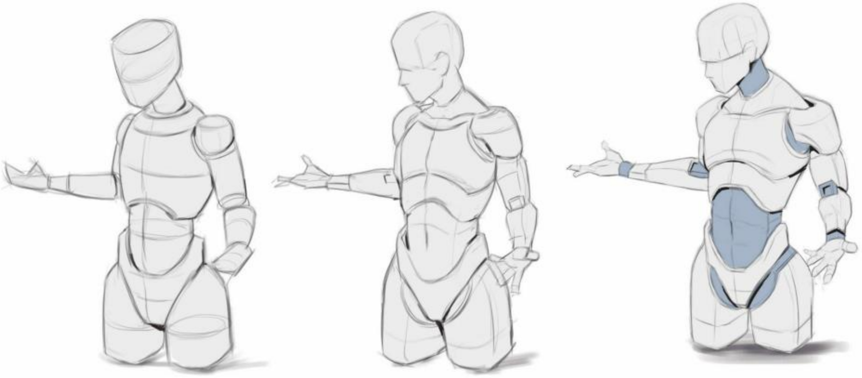
the blocks. The torso structure at different angles is shown below.



The following diagram illustrates the structural relationships of the female torso.



The following diagram illustrates the structural relationships of the male torso.



2.2 Understanding and Drawing Techniques of the Thoracic Cavity

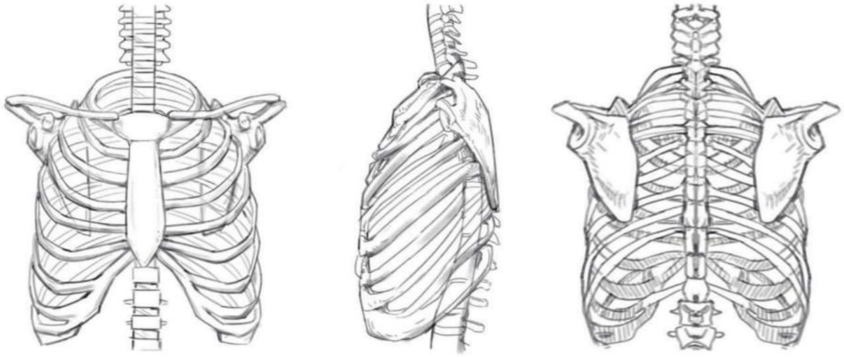
As a crucial component of the human torso, the thoracic cavity plays a vital role in connecting the upper and lower body, making its proportions and perspective accuracy paramount. This section will analyze the basic proportions of the thoracic cavity; however, in actual drawings, human proportions vary between genders and between different painting styles.

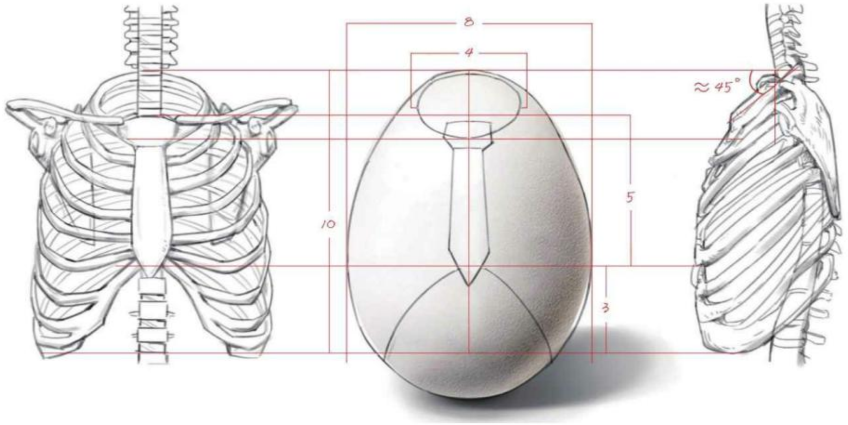
of.

2.2.1 Basic Proportions of the Thoracic Cavity

Based on the ribcage, the chest cavity resembles an oval egg from the front, and its side profile is approximately half the size of the oval from the front. As shown in the image

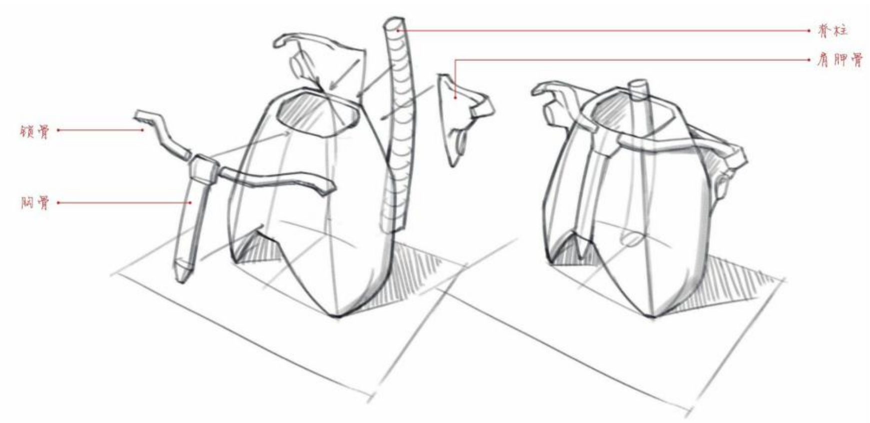
below, if the height of the chest cavity is approximately 10, then its width is approximately 8, the width of the circle connecting to the neck is approximately 4, the slope is approximately 45°, the length of the sternum is approximately 5, and the width of the "arch" below the chest cavity is approximately 3.





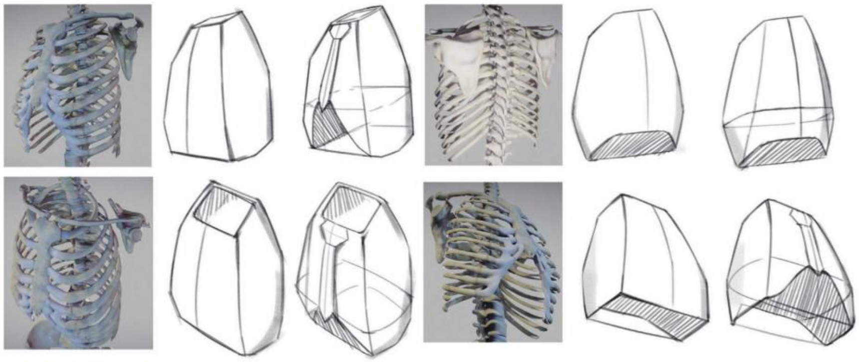
2.2.2 Structure and Fluoroscopy of the Thoracic Cavity

The structure of the thoracic cavity is very simple. The clavicle and sternum on the front of the thoracic cavity form the shape of a bicycle handlebar. The two triangular scapulae on the back and the clavicle in front form a ring that wraps around the entire thoracic cavity. There is a long tubular spine in the middle of the back.



Below are two approaches to practicing drawing the thoracic cavity structure. Practice

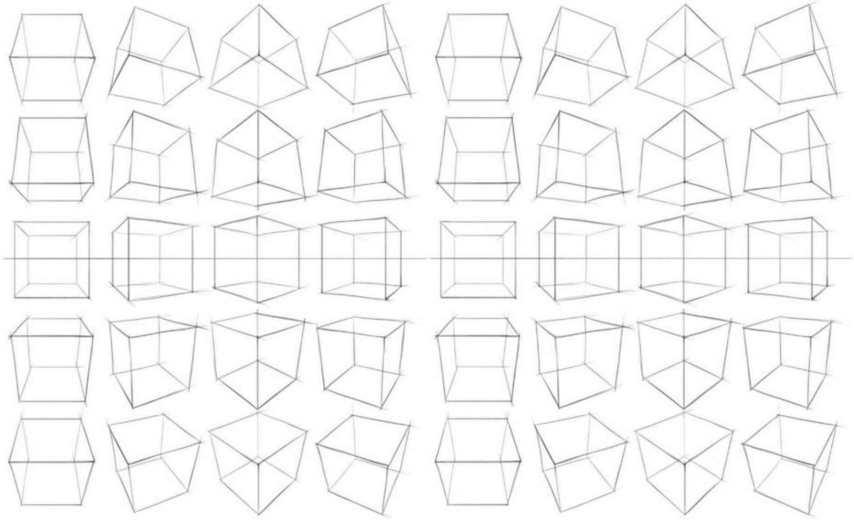
Method 1: Summarize the thoracic cavity structure based on photographs or models.



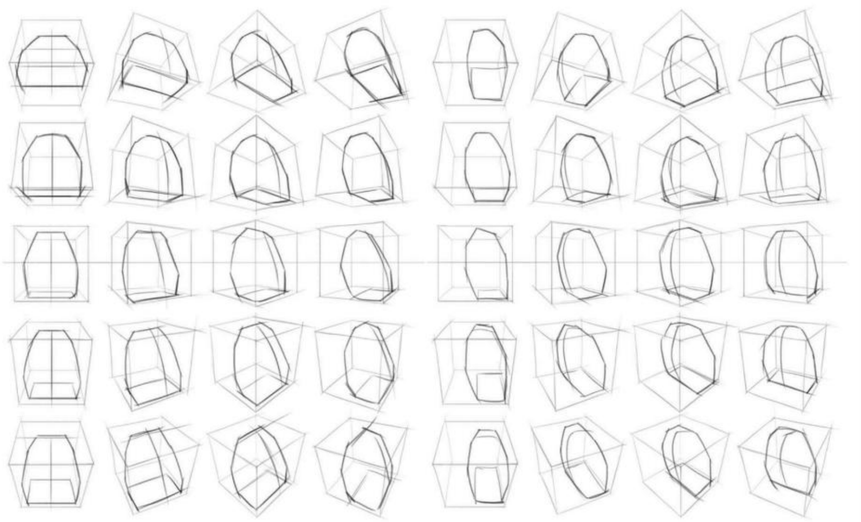
Exercise Method 2: Draw the thoracic cavity structure from different angles to enhance spatial awareness. The

specific drawing process for the thoracic cavity structure is as follows.

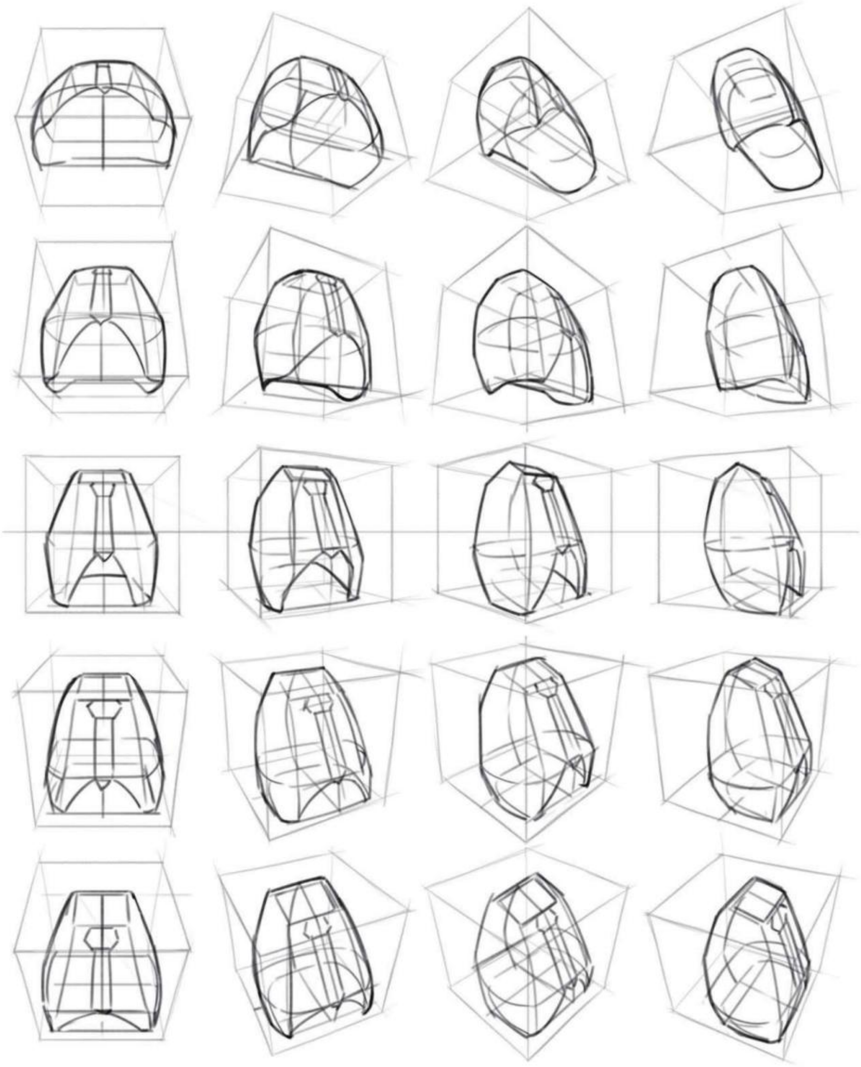
01. First, draw cubes at different angles. Creating cubes makes it easier to locate the spatial position of the thoracic cavity. When drawing, pay attention to the perspective and proportion changes of the cubes.

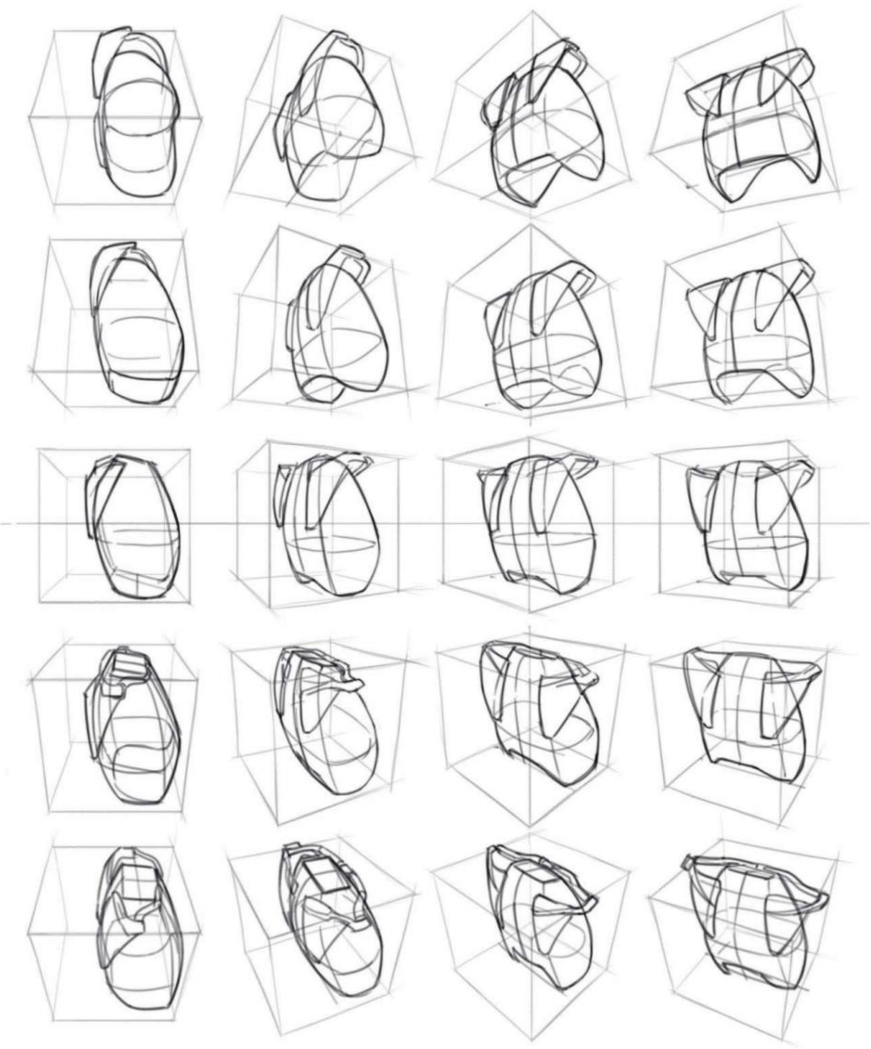


02. Draw a simplified thoracic cavity structure within a cube. Use an oval outline and calculated proportions to determine the spatial position of the thoracic cavity within the cube.



03. Refine the thoracic cavity to supplement the internal structure and perspective relationship.



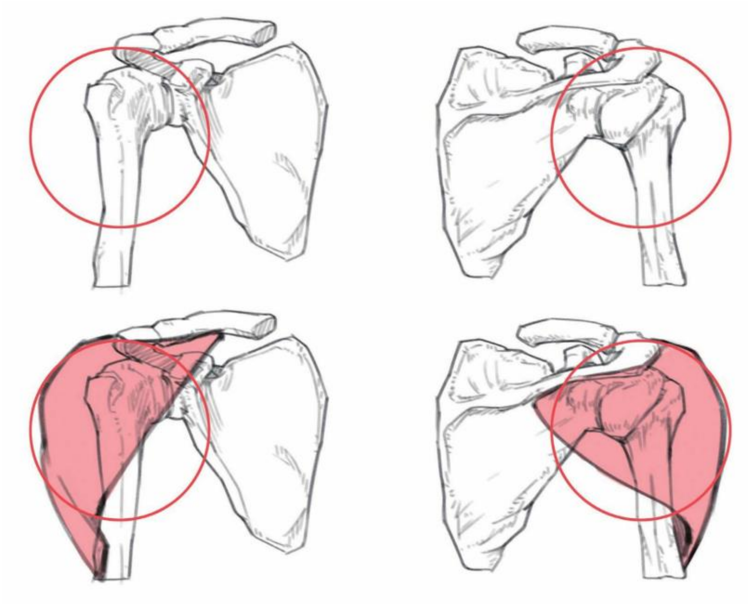


hint

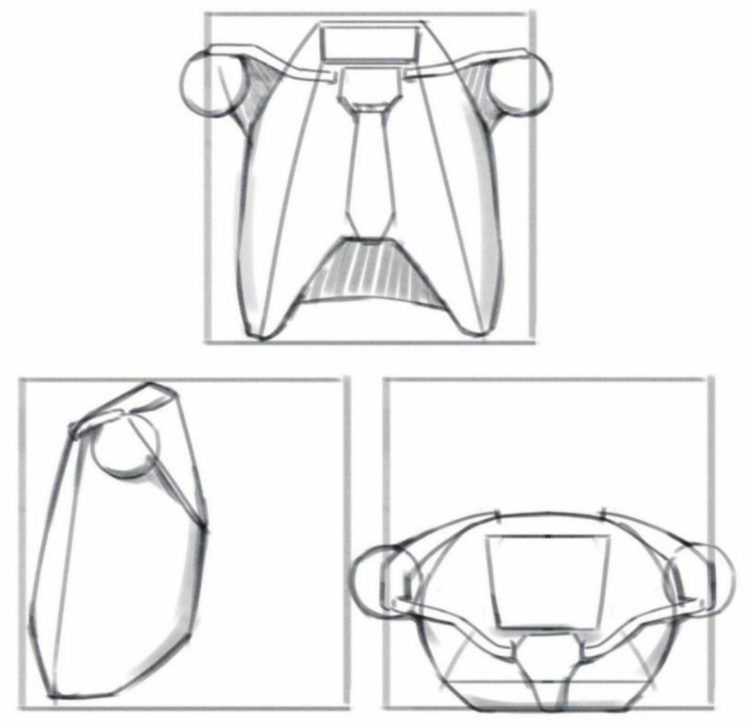
The above exercises can greatly enhance our control over spatial perception and help us establish a spatial coordinate system in our consciousness.

2.2.3 Relationship between the arm joint ball and the thoracic cavity

The ball joint of the arm connects to the chest cavity and is about the size of the deltoid muscle.



When the arms hang naturally, the joint balls are located on both sides of the chest cavity, directly below the junction of the clavicle and scapula.

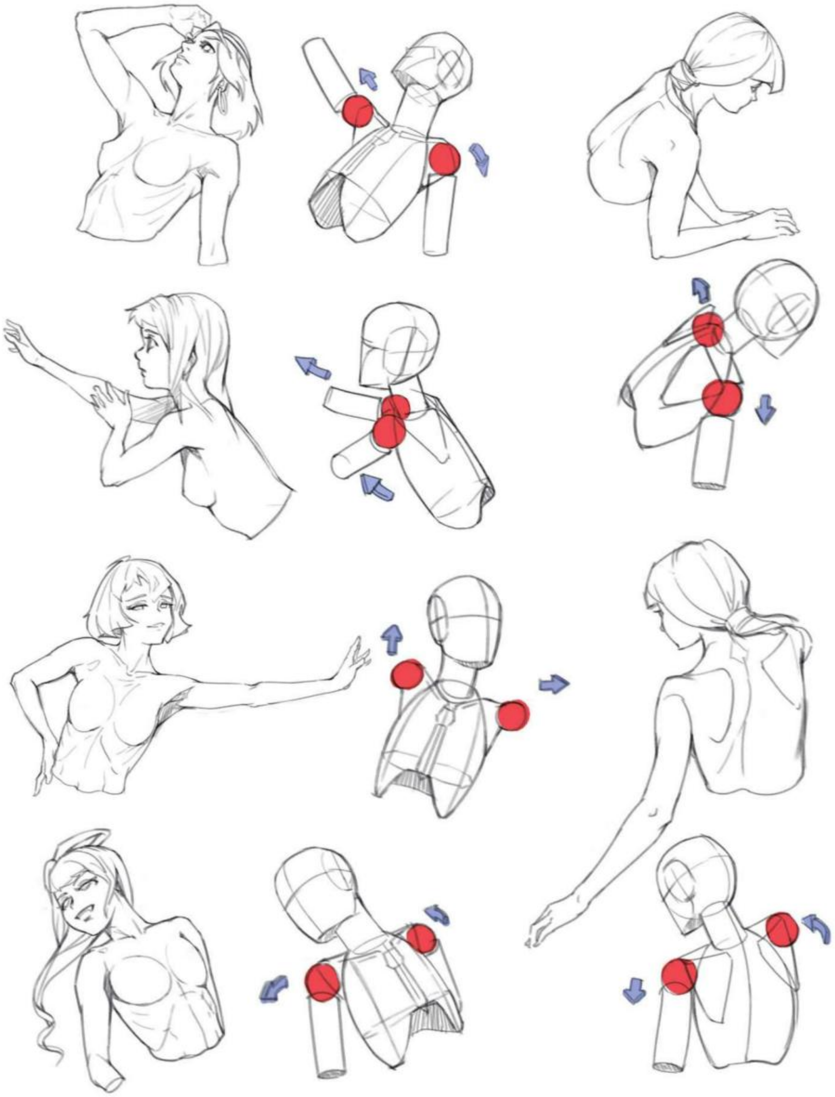


The joint ball is movable, and can move forward, backward, and to the sides through the action of the clavicle and scapula.

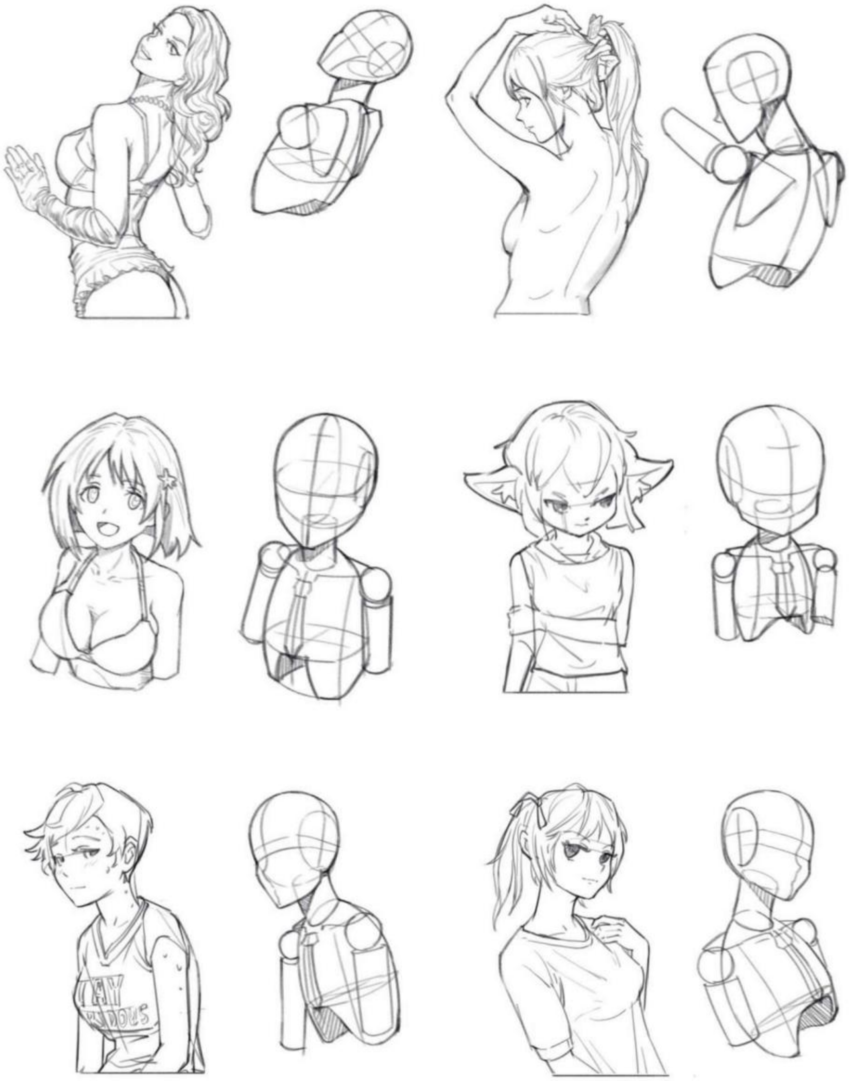
Make subtle movements up or down.

For example, when we make movements such as reaching out, shrugging our shoulders, or stretching, we can clearly feel...

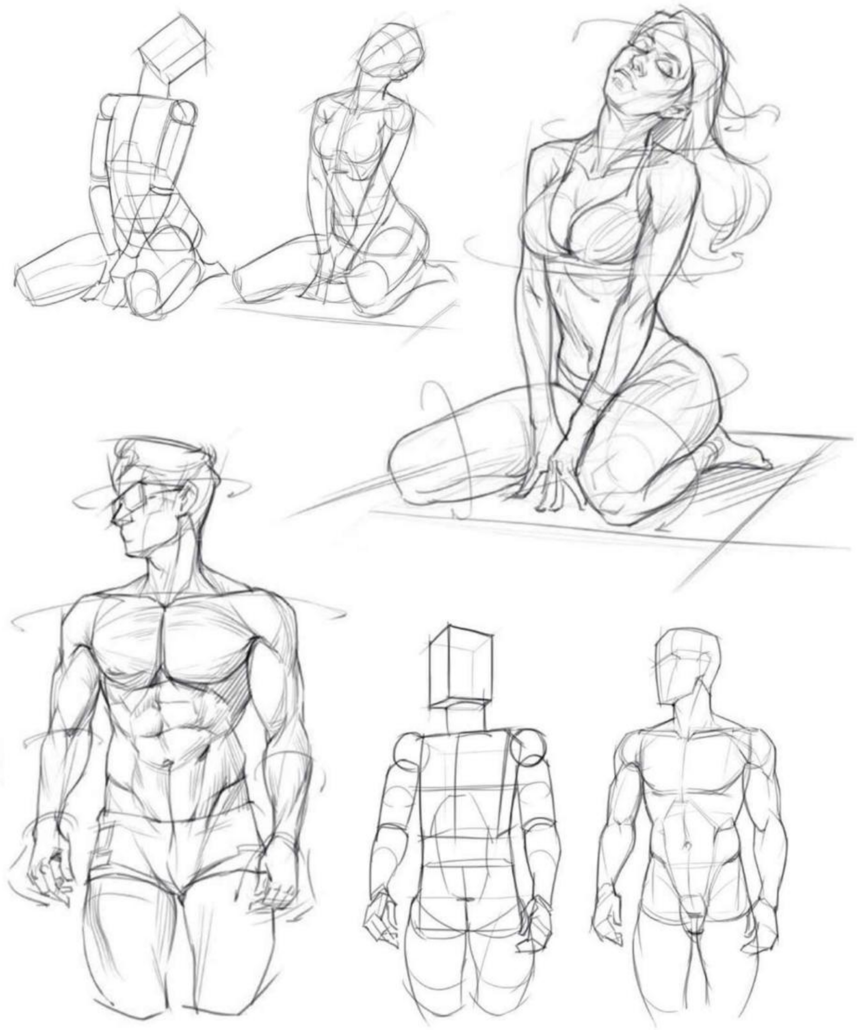
The joint ball is in motion.



The figures depicted have different body shapes, and the proportions of their joints also vary.



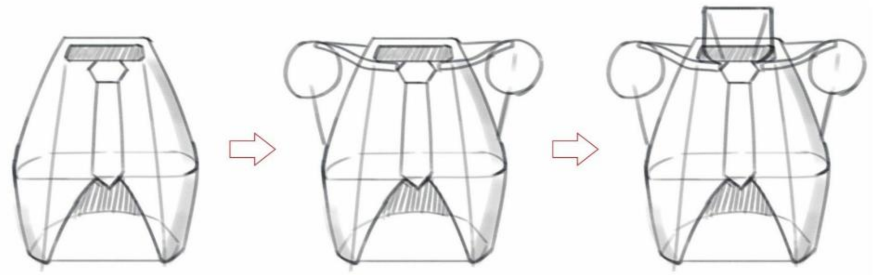
The size of the joint ball is very important during the creative process, as it affects the shoulder width ratio between men and women.



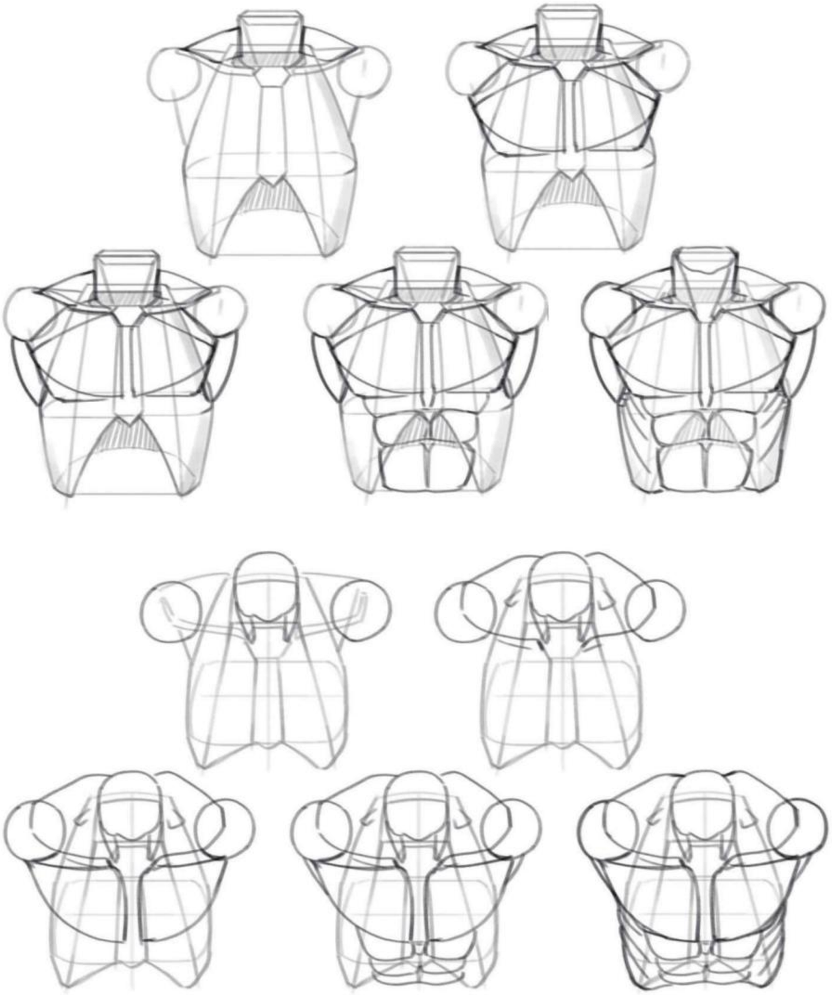
2.2.4 Adding muscles to the thoracic cavity

Once you have a basic understanding of the articular ball structure of the thoracic cavity, you can try adding muscle to the framework.

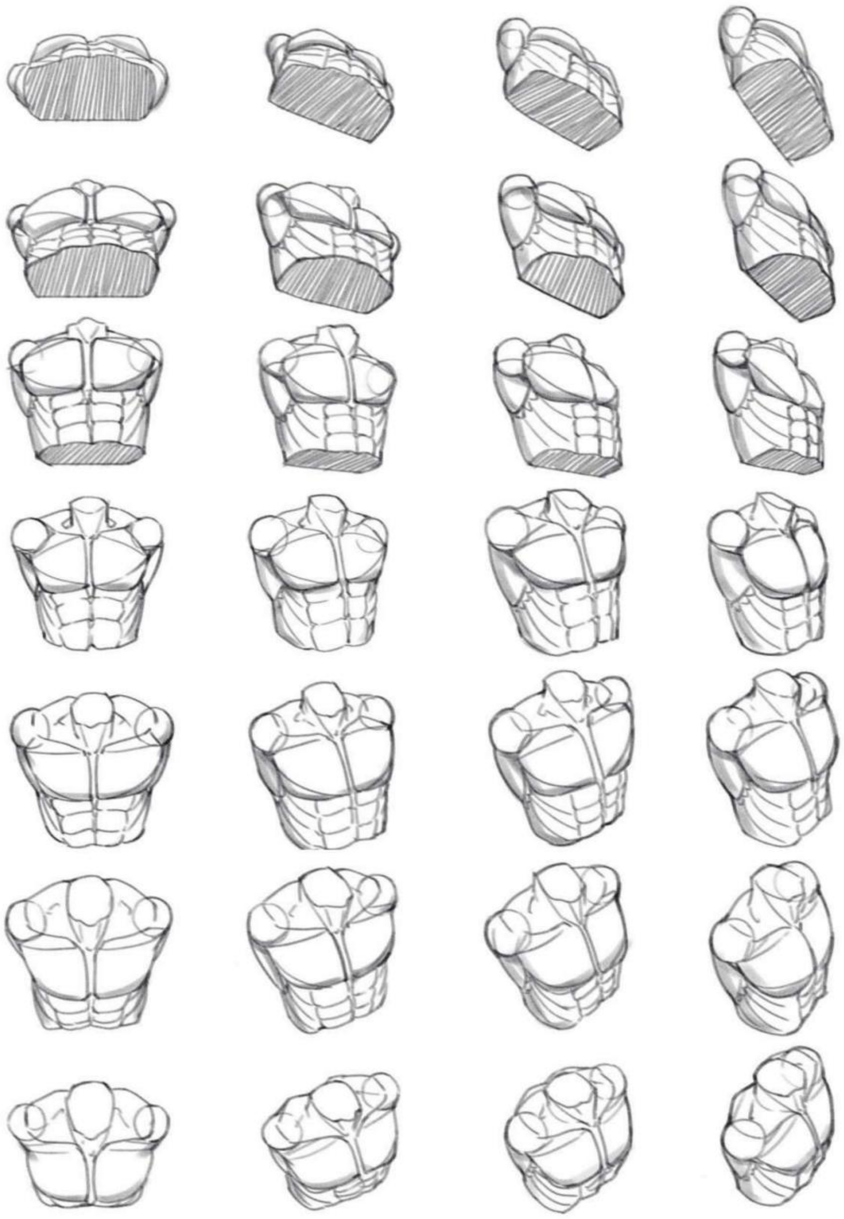
meat.



Establish a simplified thoracic stent.

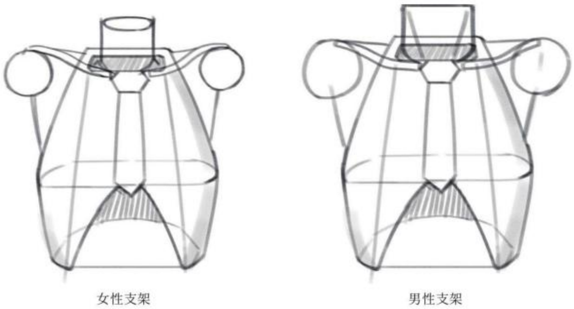


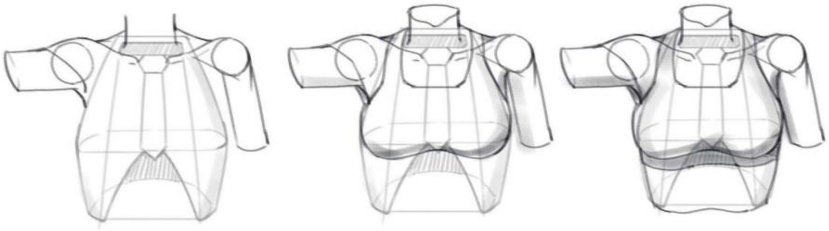
By combining thoracic frameworks at different angles and adding muscles in sequence, multi-angle thoracic drawing training can be achieved.



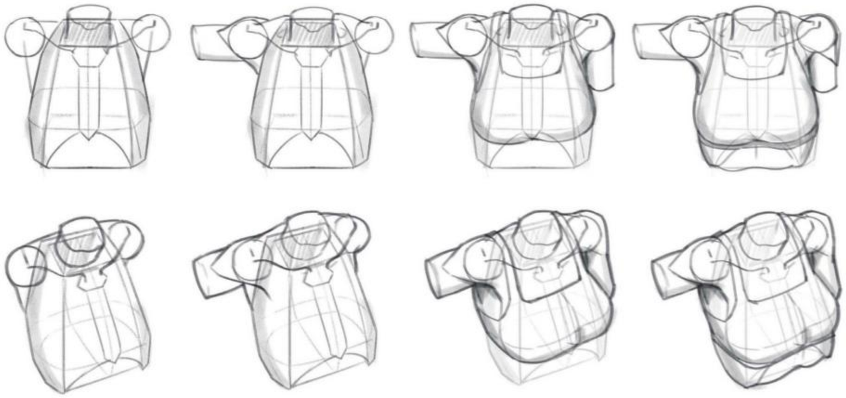
2.2.5 Characteristic features of the female thoracic cavity

When drawing a female ribcage, it's unnecessary to depict excessive muscle structure, but you can add blocks representing the breasts as needed. Compared to the male framework, the joint ball structures on the female framework are smaller, and the neck is also thinner.

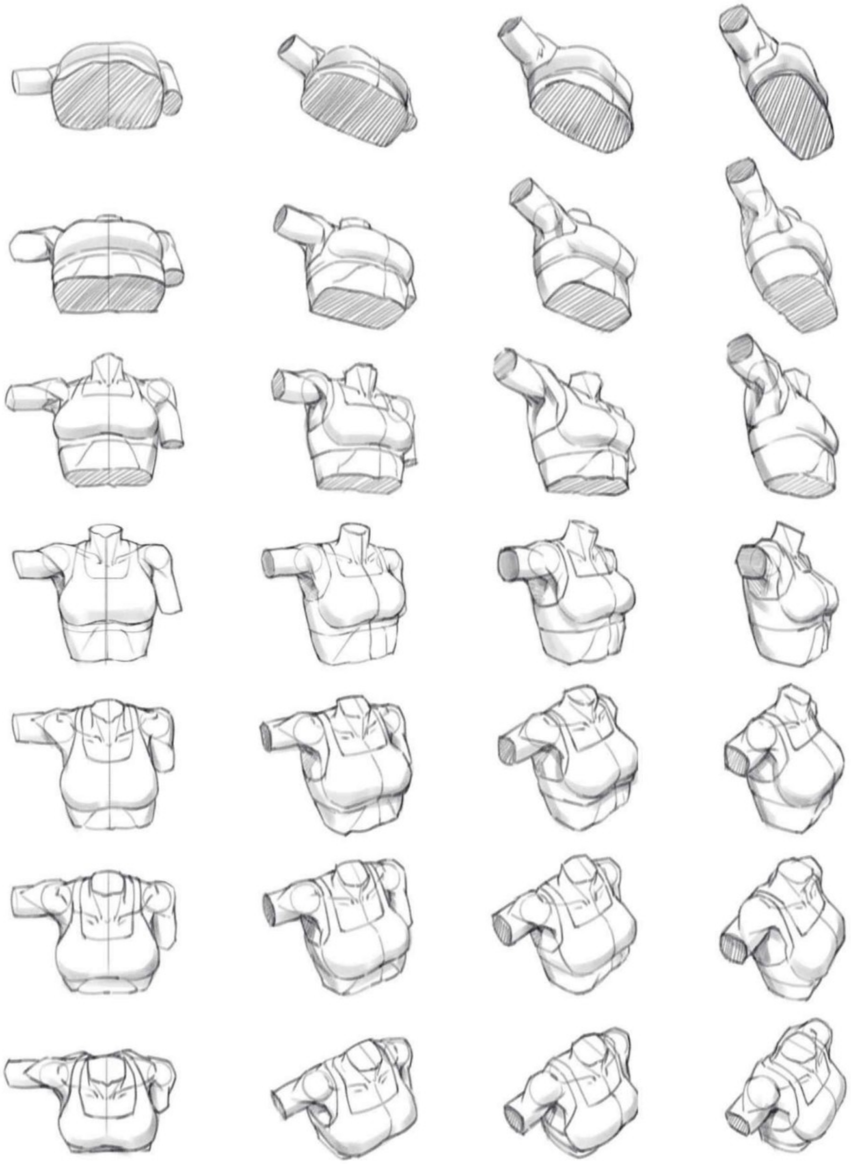


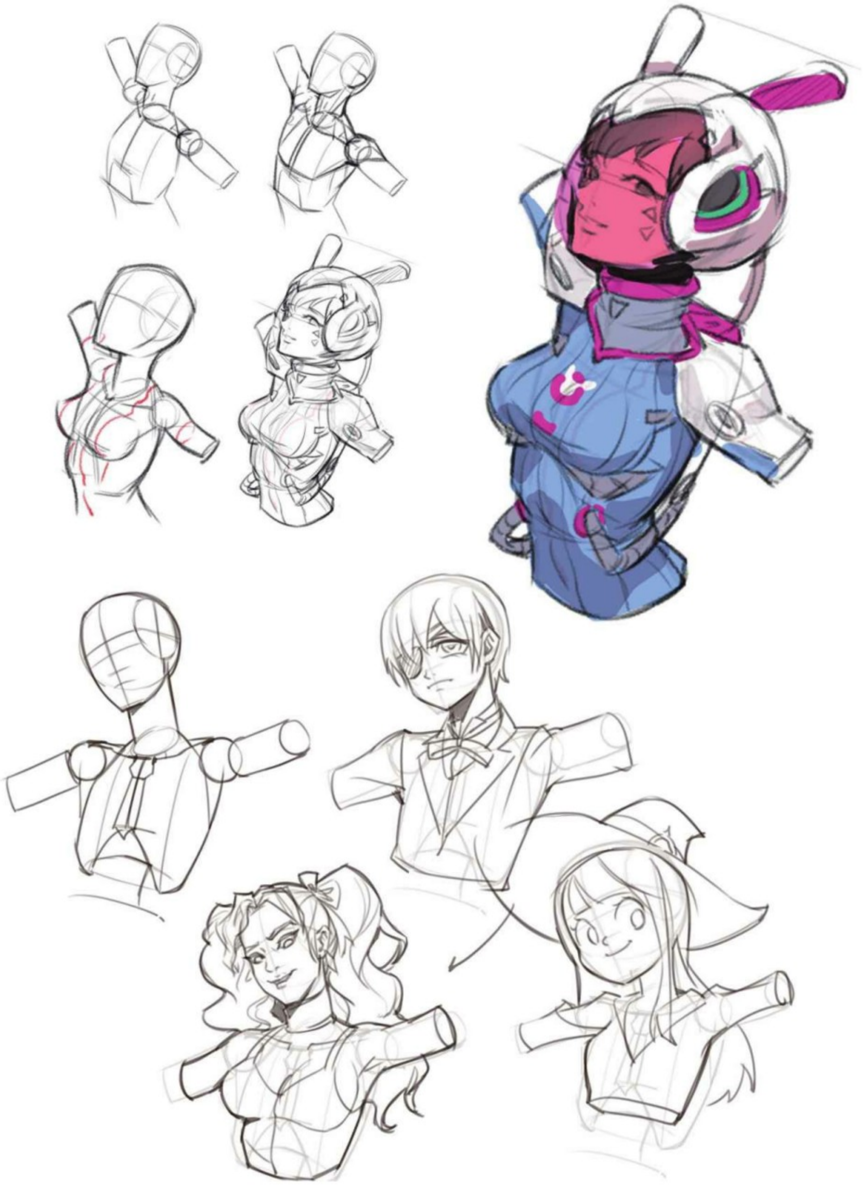


When drawing a woman, you need to add the deltoid muscle and chest structure to the support.



When drawing the thoracic cavity from other angles, as long as the positional relationship of the body blocks is drawn correctly, the characteristics of the female thoracic cavity can be accurately represented.





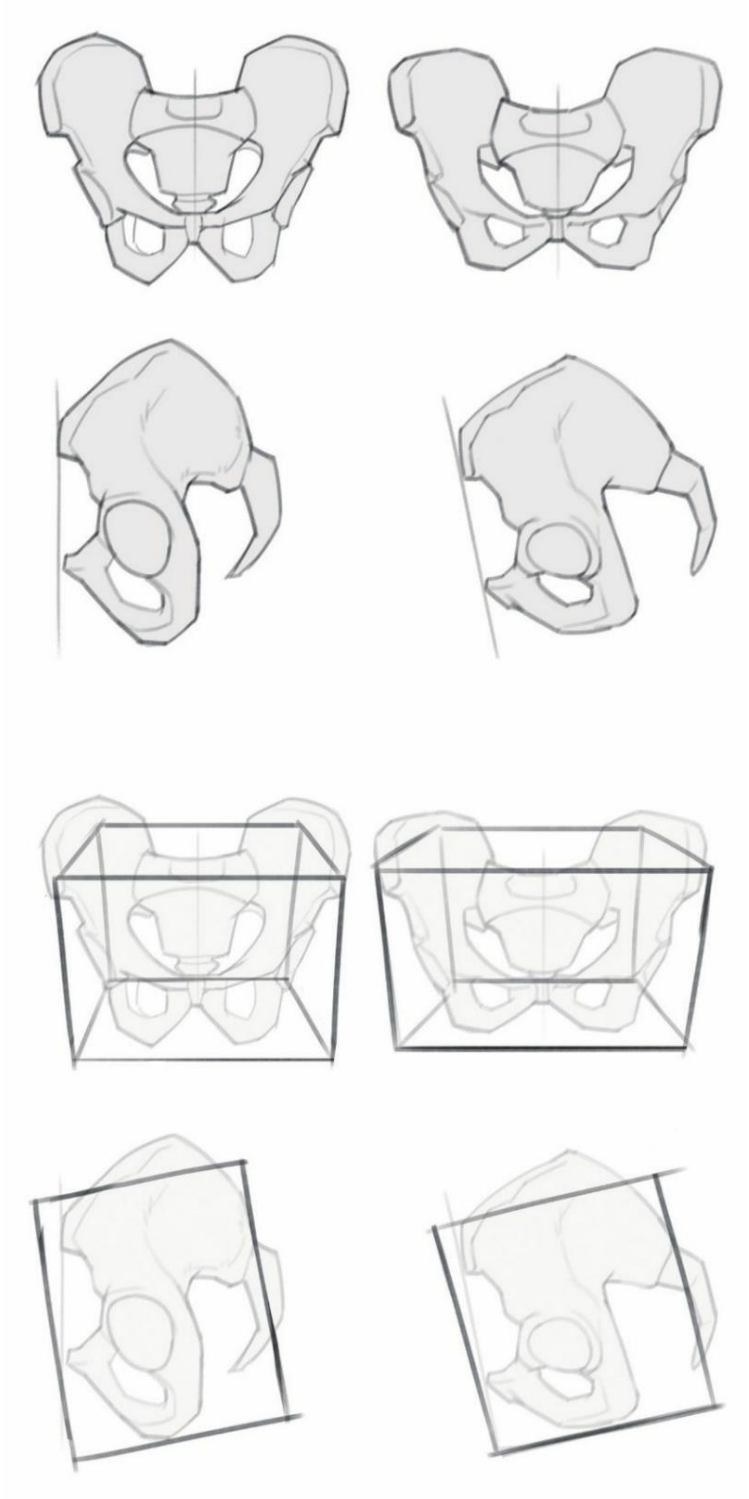
2.3 Pelvic proportions and spatial perception

The pelvis is a relatively complex human structure, and there are significant differences between male and female pelvises. Therefore, in addition to understanding the proportions of male and female pelvises, it is also necessary to simplify the structure of the pelvis for easier understanding and memorization. Memories.

2.3.1 Pelvic Proportions

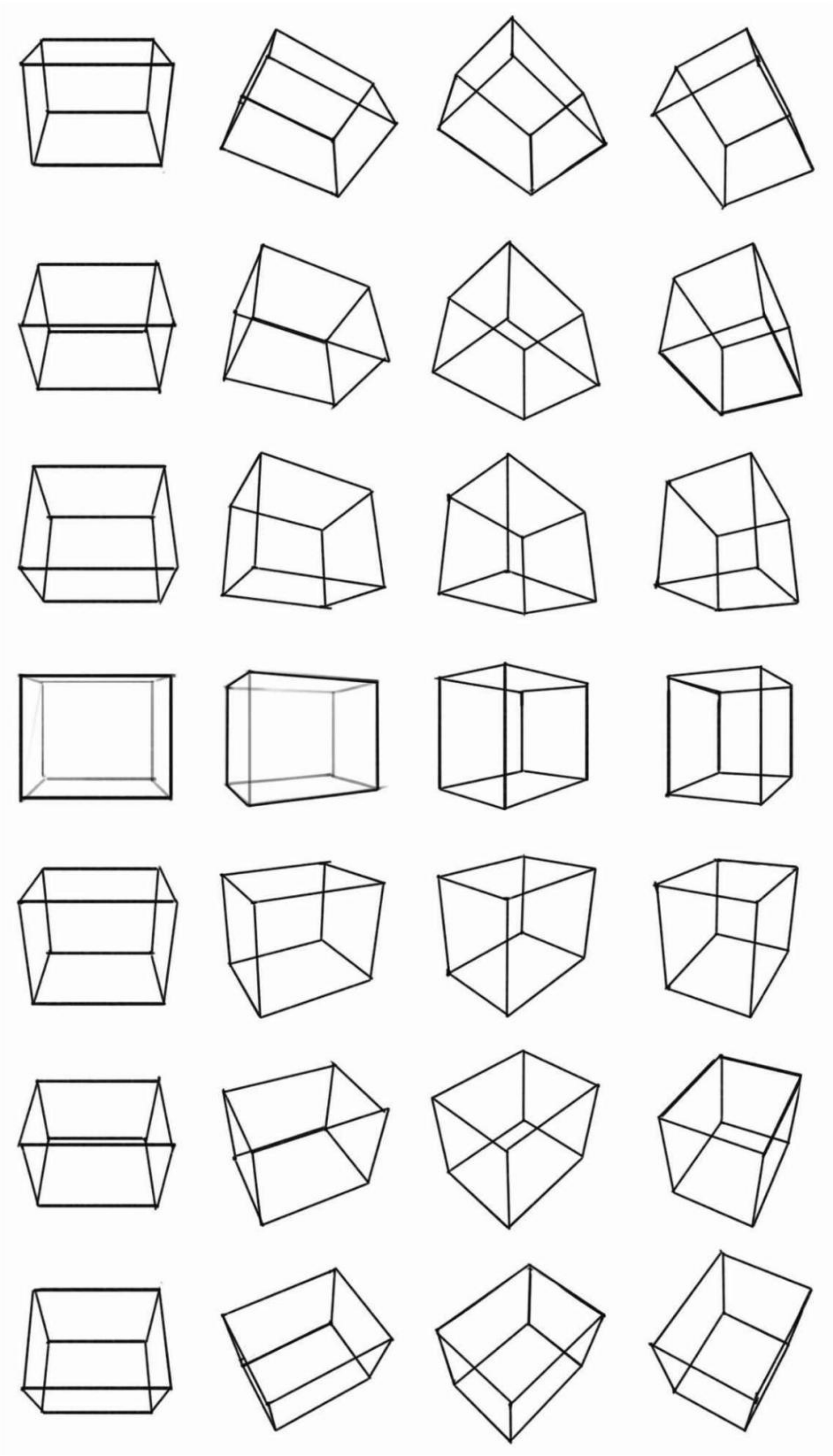
Observe the image below to understand the proportional differences between male and female pelvises. From the front, the length-to-width ratio of the male pelvis is closer, and from the side, it is almost untilted. In contrast, from the front, the female pelvis is wider, and from the side, it has a greater degree of tilt.

Based on the above, we can obtain the approximate length, width, and height values of the male and female pelvis. For ease of analysis, Place the male and female pelvises into the cube and take the average value of the difference between the male and female to obtain a cuboid with a thickness of 0.75, a height of 0.75, and a width of 1.



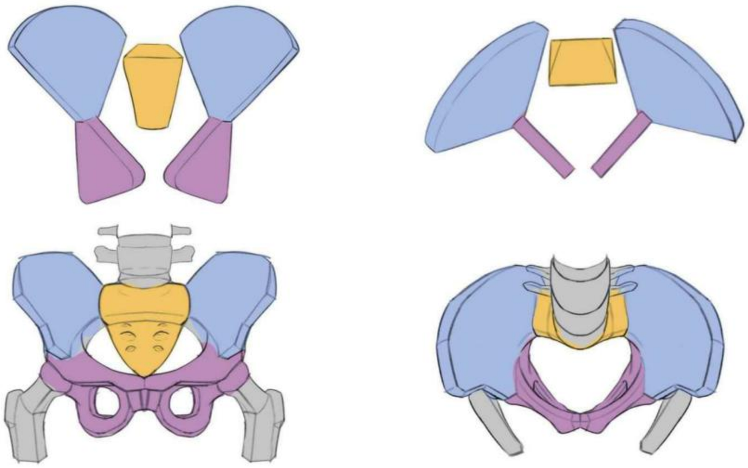
In actual drawing, the differences between male and female pelvises can be represented by adjusting the length, width, and height of a cuboid.

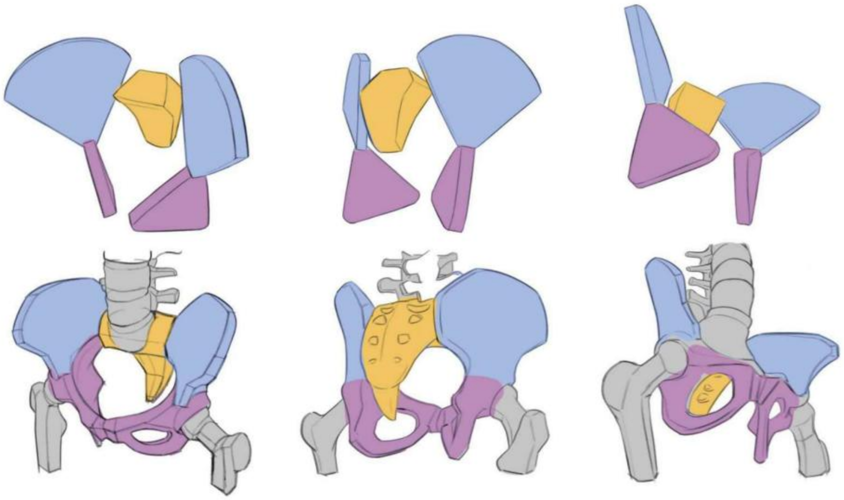
The image below shows a cuboid representing the pelvis from different angles.



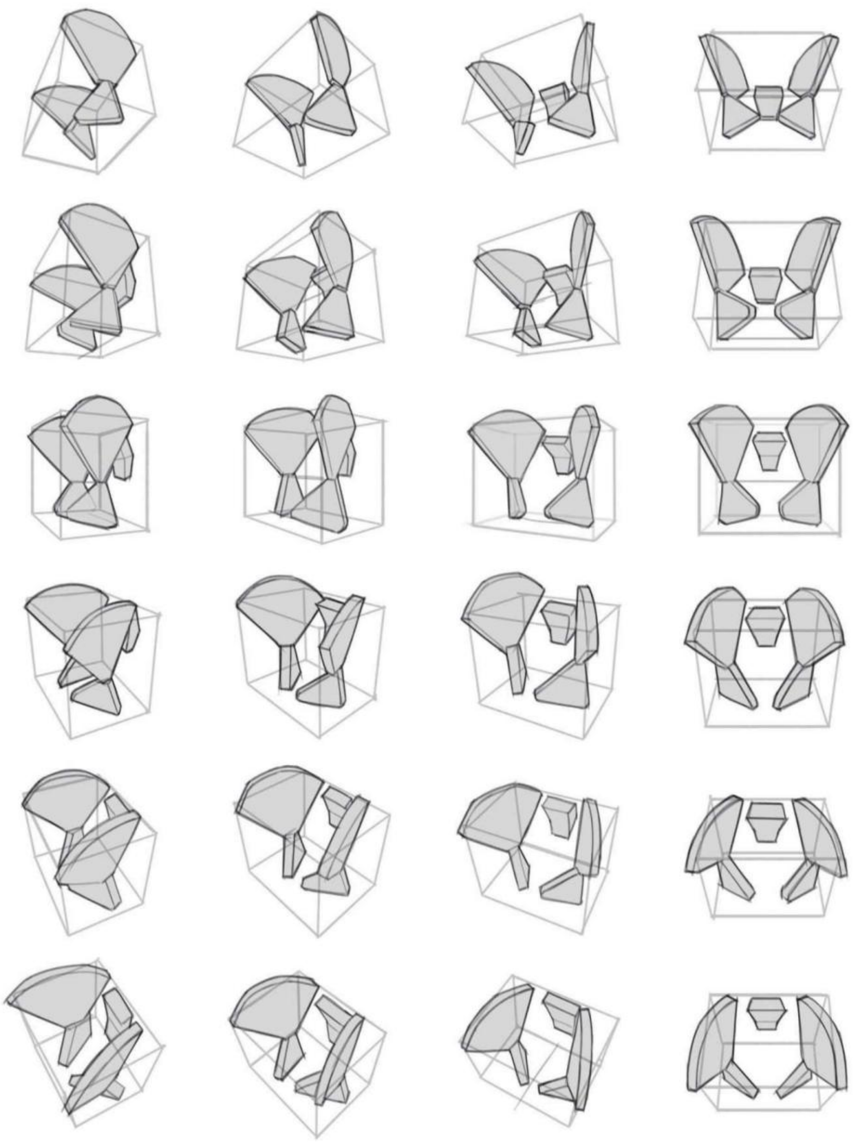
2.3.2 Simplification of Pelvic Structure and Spatial Perception

Simplifying the complex pelvic structure makes it easier to find the perspective variations of the pelvis in spatial representation. change.





By placing the simplified pelvis into the previously calculated cuboid, various angles can be obtained. A simplified pelvis. When drawing the human body, the bony points and orientation of the pelvis can be determined using a cuboid, paying attention to the perspective and proportional changes of the cuboid.



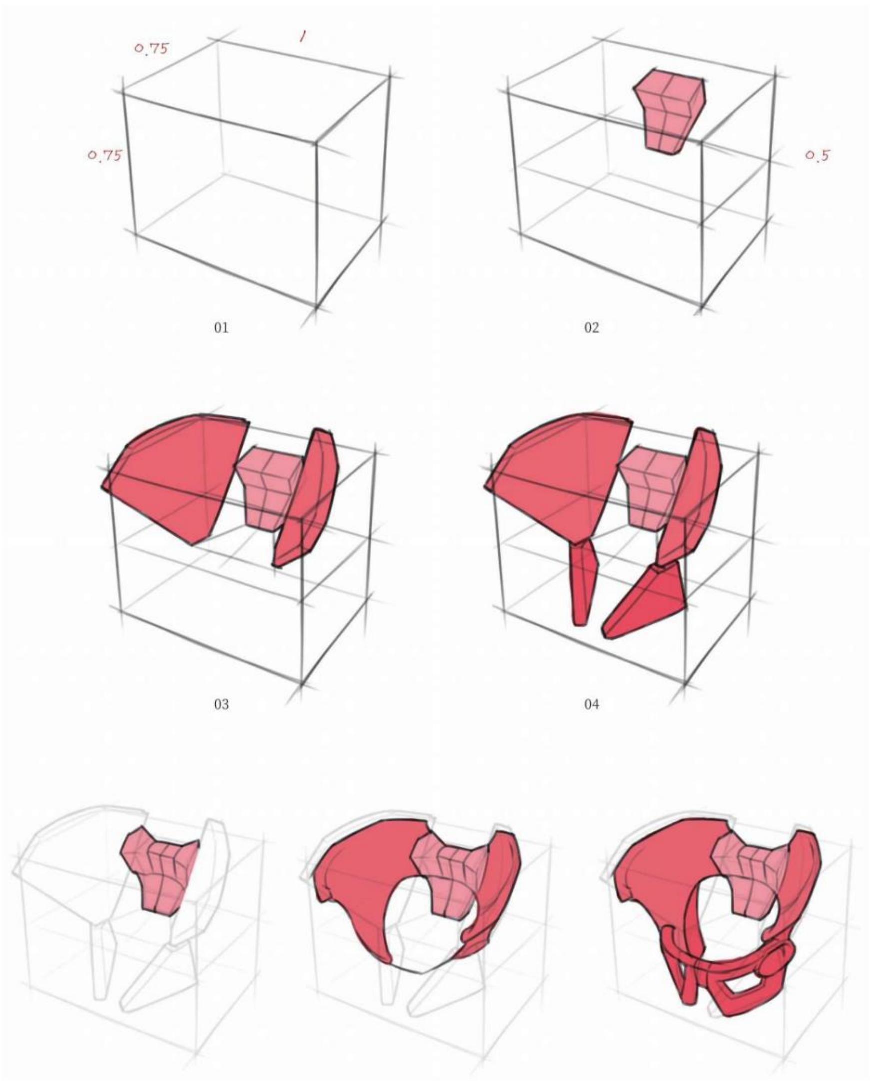
The actual pelvic structure can be reconstructed using a simplified cuboid, and the specific process is as follows.

01 Draw a cuboid with appropriate proportions.

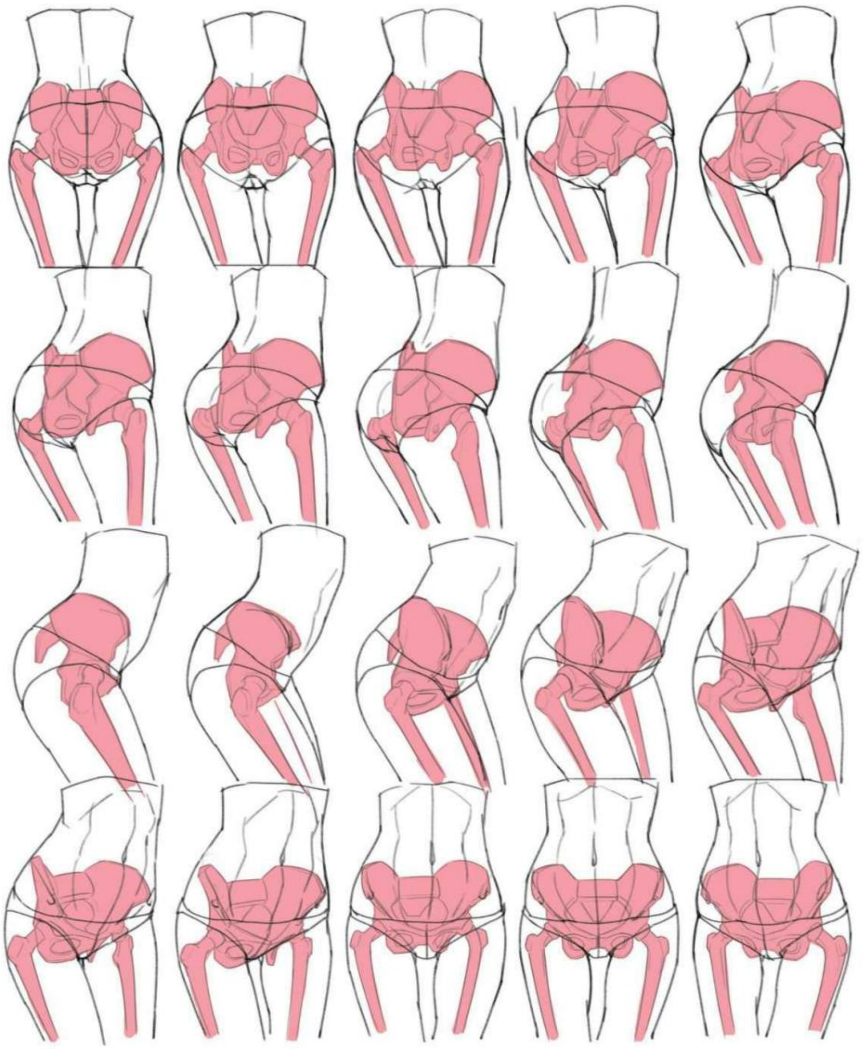
02. Determine the position of the coccyx within the cuboid.

03 Determine the spatial relationship of the sector (iliac bone).

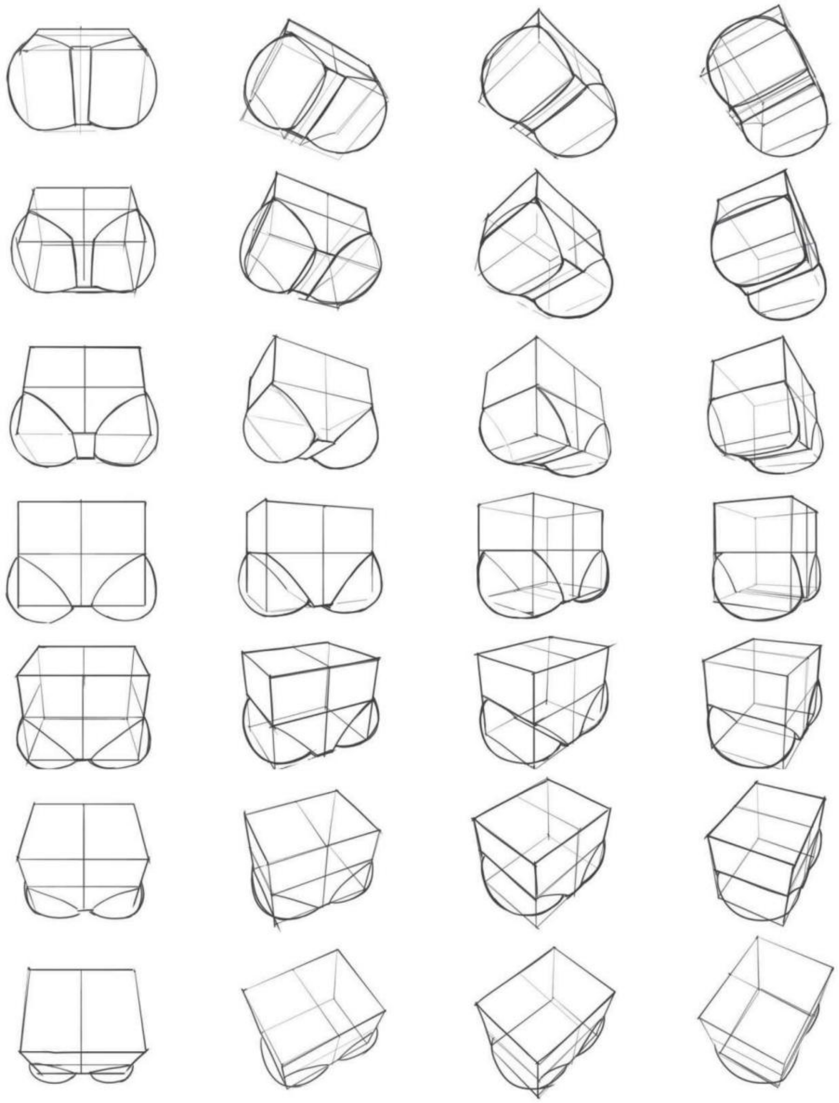
04 Draw an ellipse at the bottom to determine the positions of the two small triangles.


0.75
1
0.75
0.5
01
02
03
04

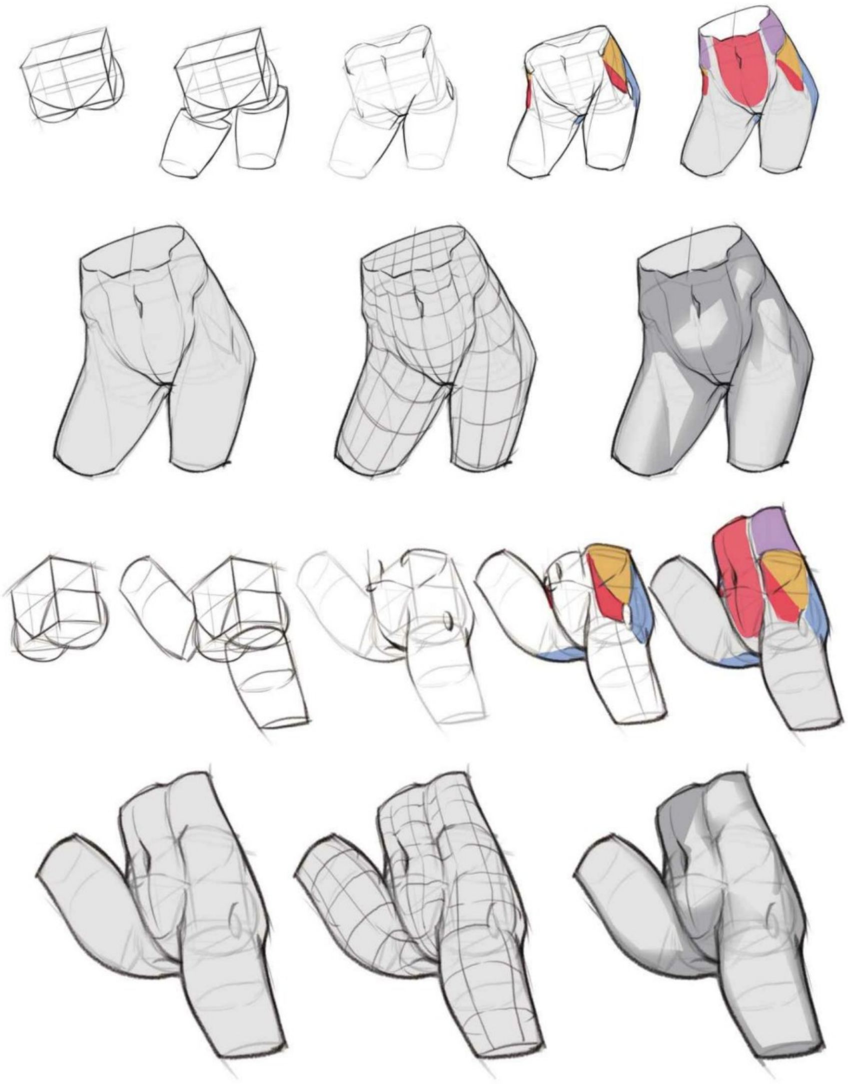
Add muscles to the pelvis at different angles and use anatomical knowledge to represent hip rotation.

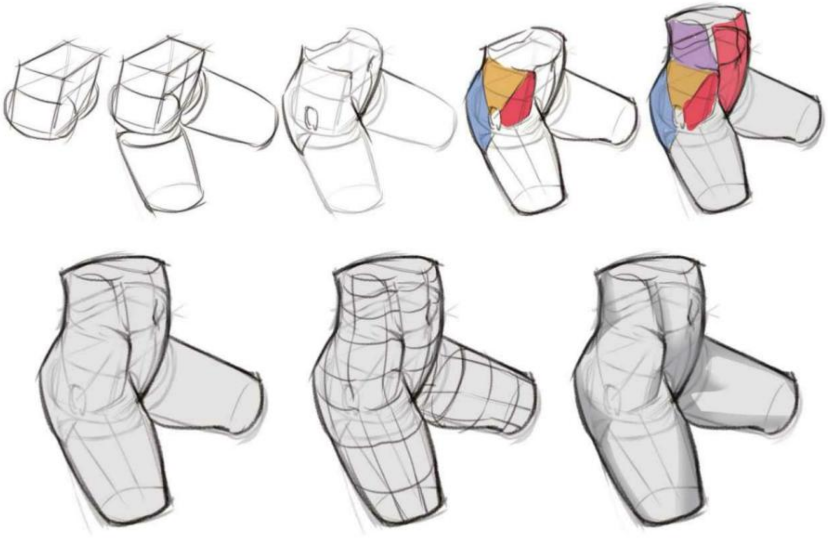


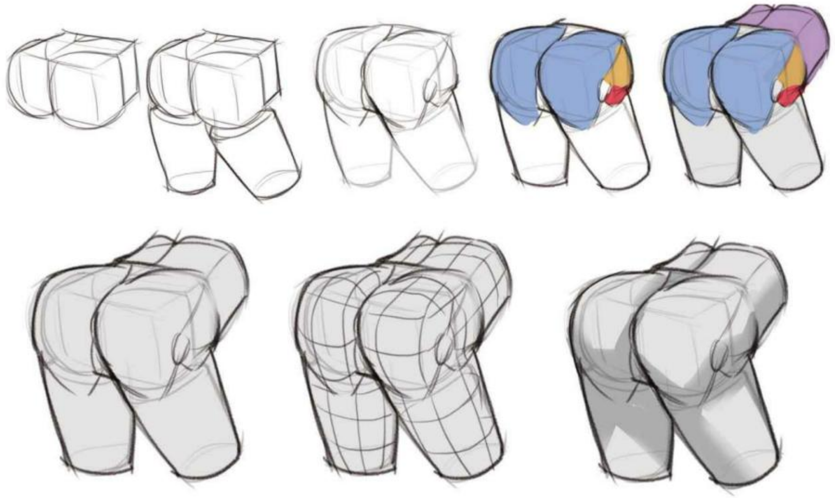
After mastering the above methods, you can directly use a cuboid to determine the position of the pelvis in actual drawing. As shown in the figure below, we directly use a cuboid plus joint balls to represent the pelvis.



With the aid of a cuboid and the addition of muscle structures, you can obtain the desired diagram of the human body structure.







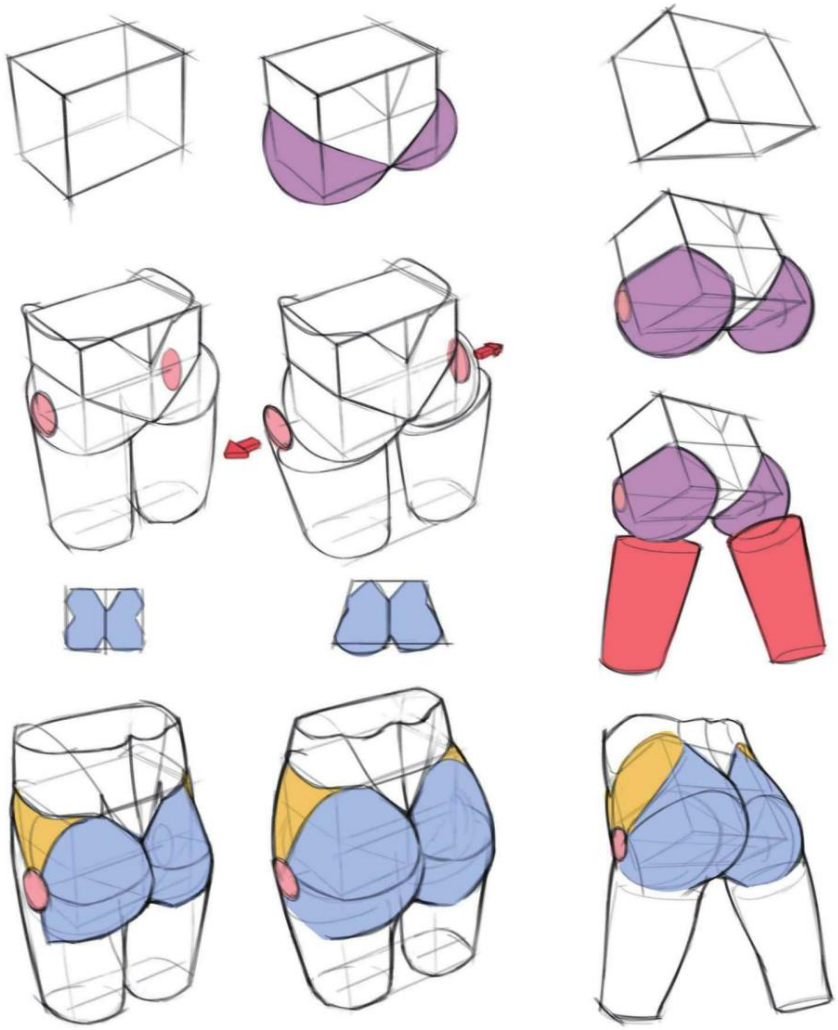
> **hint**
>
> In the above drawing process, the most important thing is to first create a cuboid representing the pelvis, and then...
>
> Use the spatial perspective coordinates of a cuboid to draw the muscles in the corresponding areas.

2.3.3 The Influence of the Pelvis on the Drawing of the Hips

The shape of the buttocks differs significantly between men and women, mainly due to the different proportions of the length, width, and height of the pelvis.

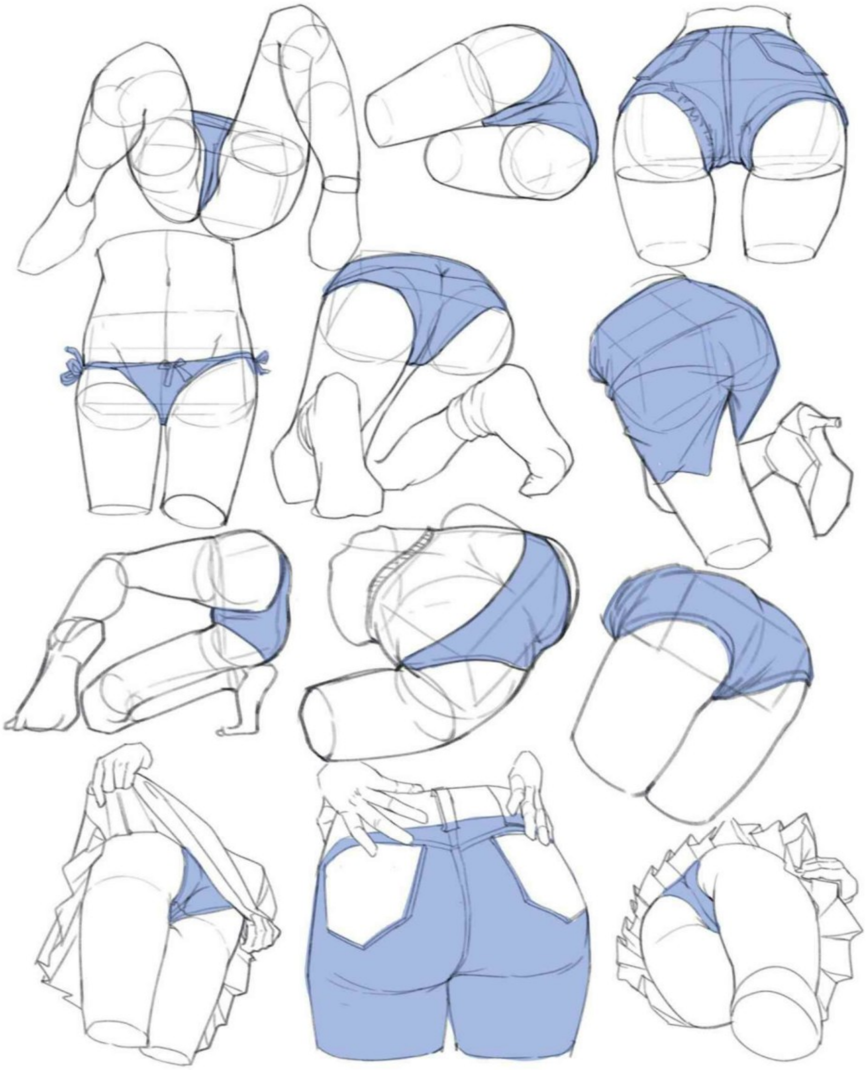
When reflected in a cuboid representing the pelvis, the cuboid representing the female pelvis is wider, therefore...

The greater trochanter of the femur in women is slightly wider than that in men.



When drawing a woman's buttocks, pay attention to the positional changes of the greater trochanter of the femur, and try to draw the buttocks as rounded and full as possible. After mastering the above techniques for drawing buttocks, you can do some specific exercises in drawing buttocks.

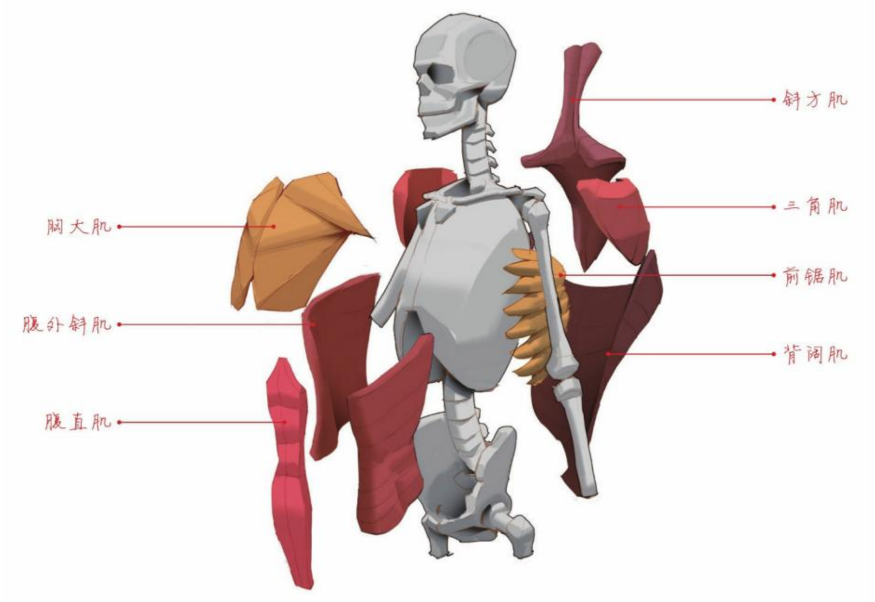
Add clothing according to the structure of the hips.



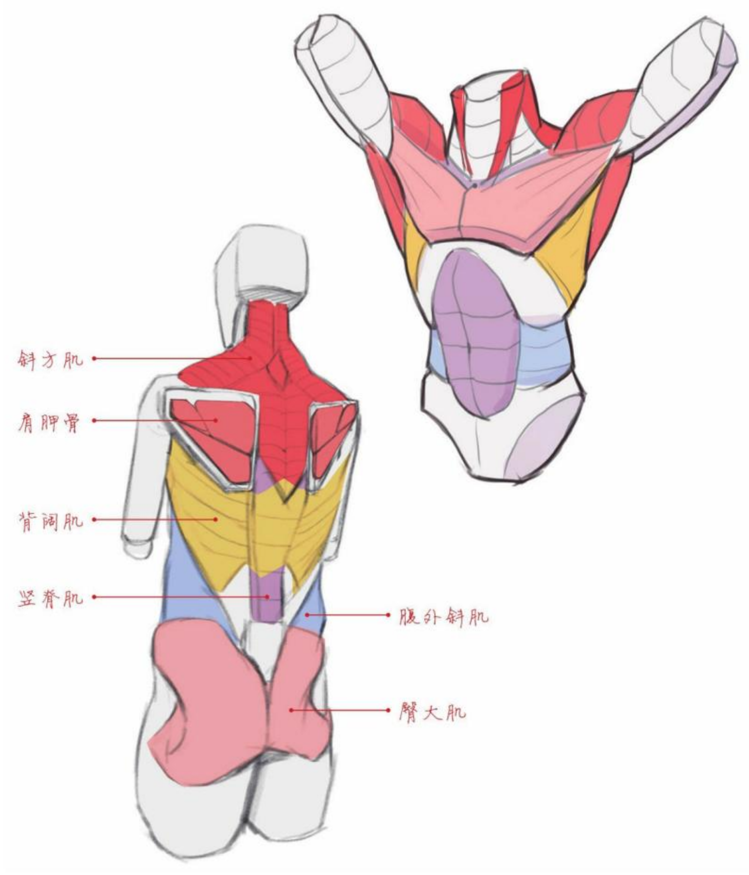
2.4 The Influence of Trunk Bones and Muscles on Body Surface Appearance

Before delving into the specific impact of the trunk skeleton and muscles on body surface appearance, let's first briefly discuss...

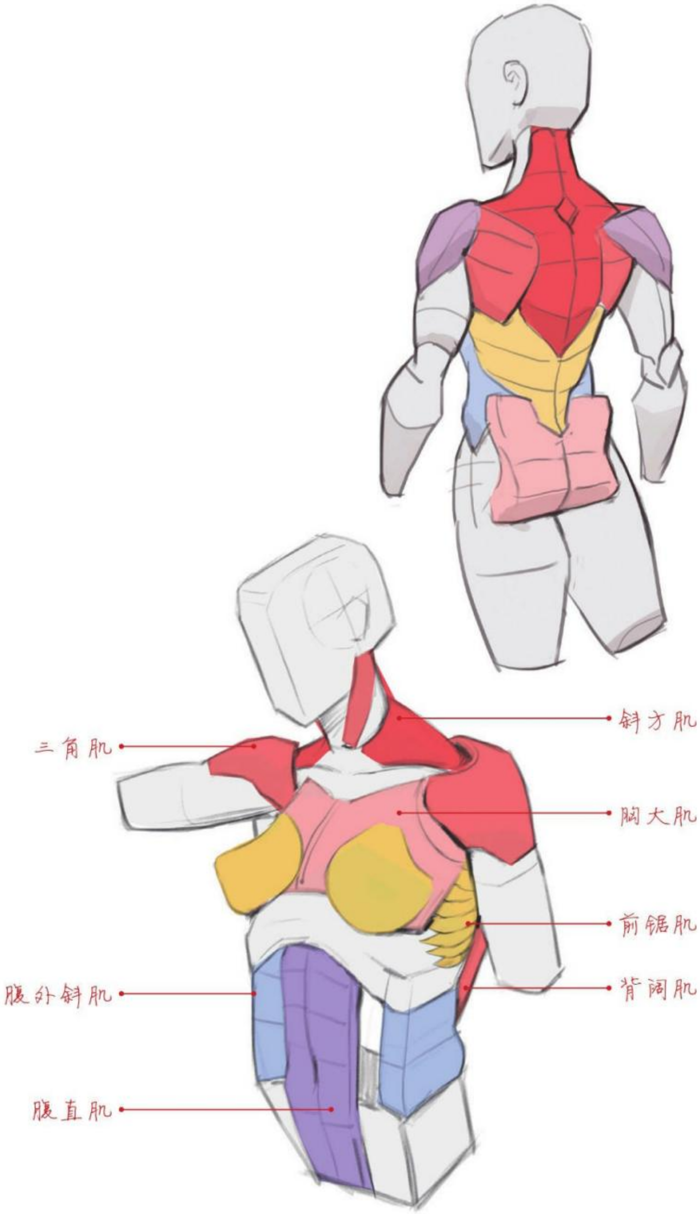
Explain the names and shapes of the bones and muscles of the torso.



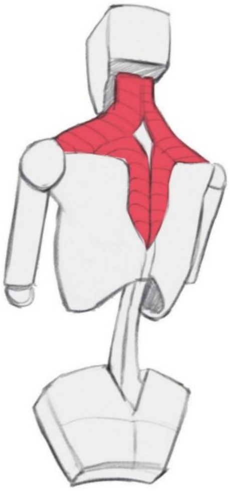
Anatomical diagram of trunk muscles

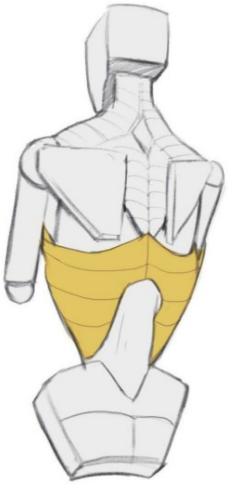

斜方肌
肩胛骨
背阔肌
竖脊肌
腹外斜肌
臀大肌

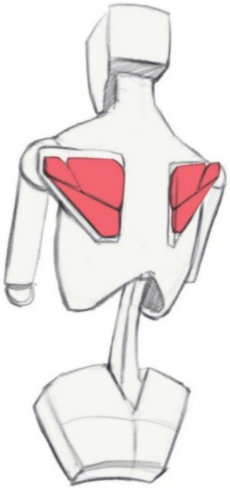
male

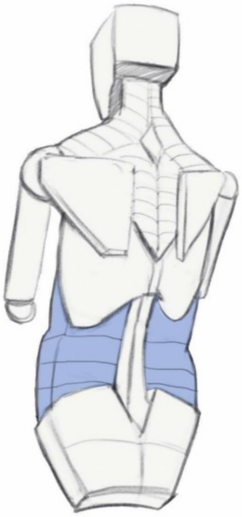

斜方肌
三角肌
胸大肌
前锯肌
背阔肌
腹外斜肌
腹直肌

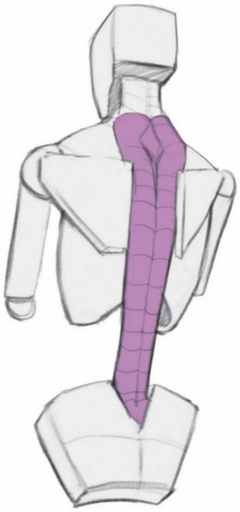
woman

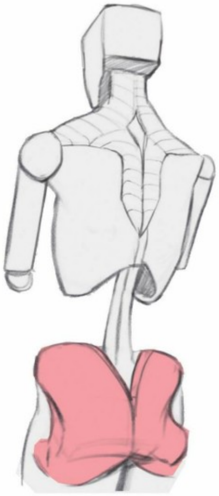

斜方肌

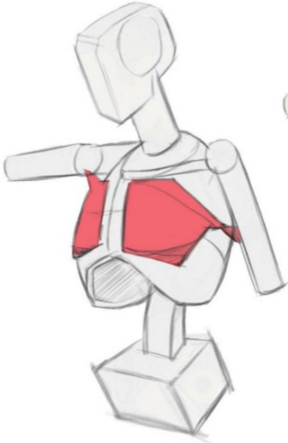

背阔肌


肩胛骨

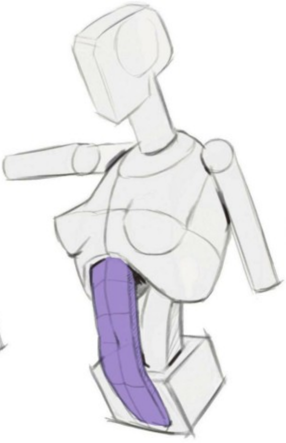

腹外斜肌


竖脊肌

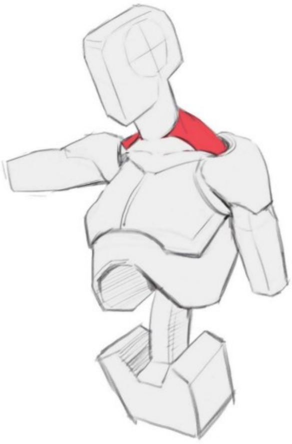

臀大肌



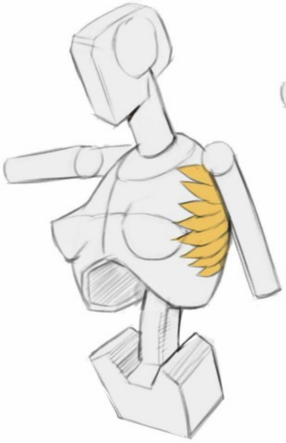
胸大肌



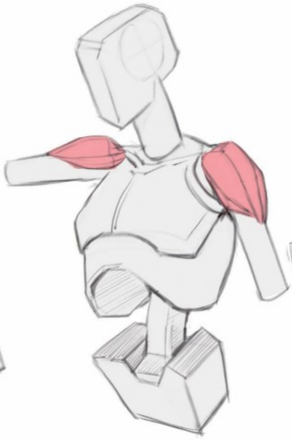
腹直肌



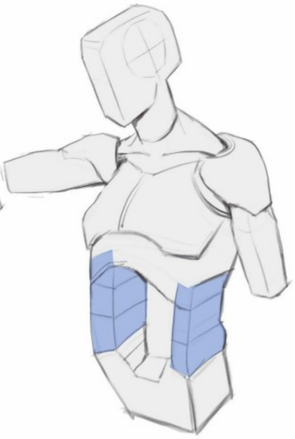
斜方肌



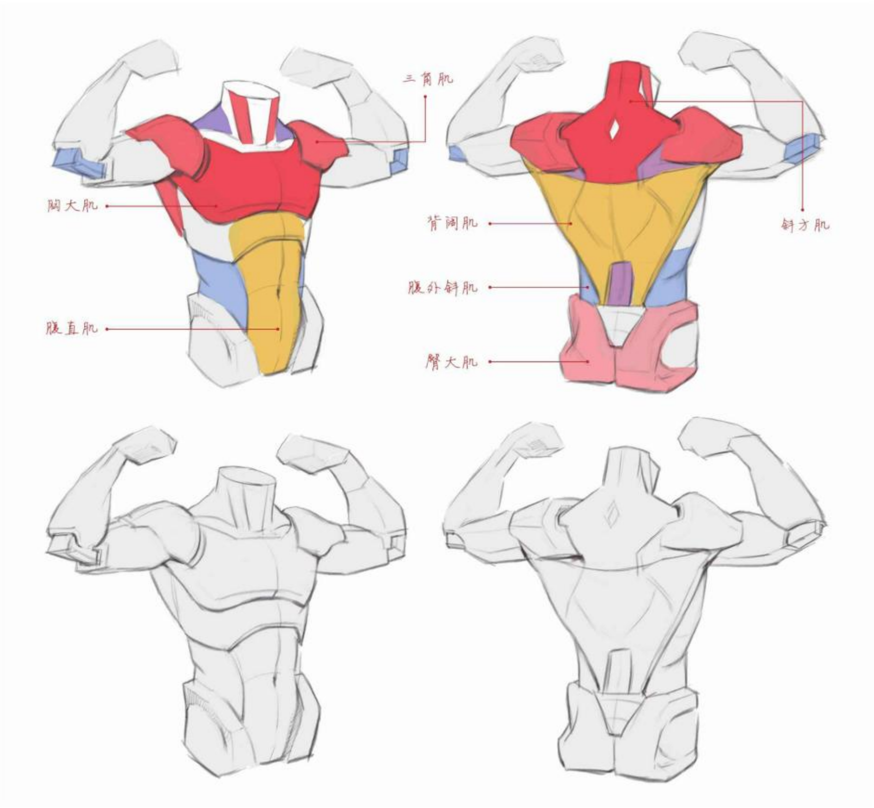
前锯肌



三角肌

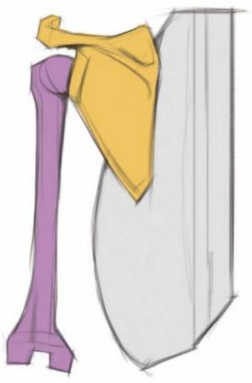


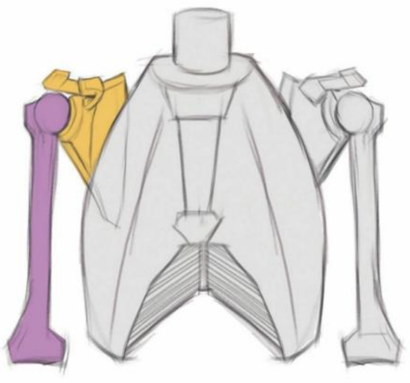
腹外斜肌

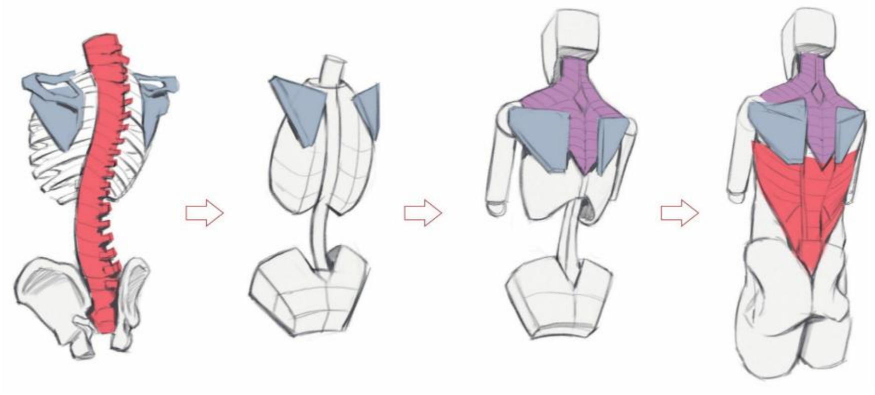

三角肌
胸大肌
腹直肌
背阔肌
斜方肌
腹外斜肌
臀大肌

2.4.1 The Influence of the Scapula and Muscle Groups on Body Surface Appearance

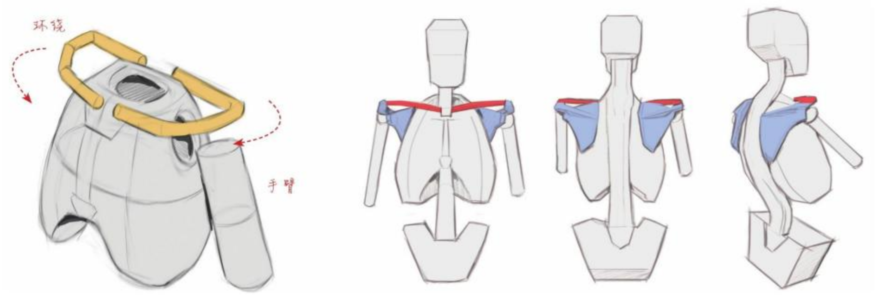
Consider the scapula, collarbone, and arm as a whole; when the arm moves, the collarbone and scapula will move accordingly.


背面

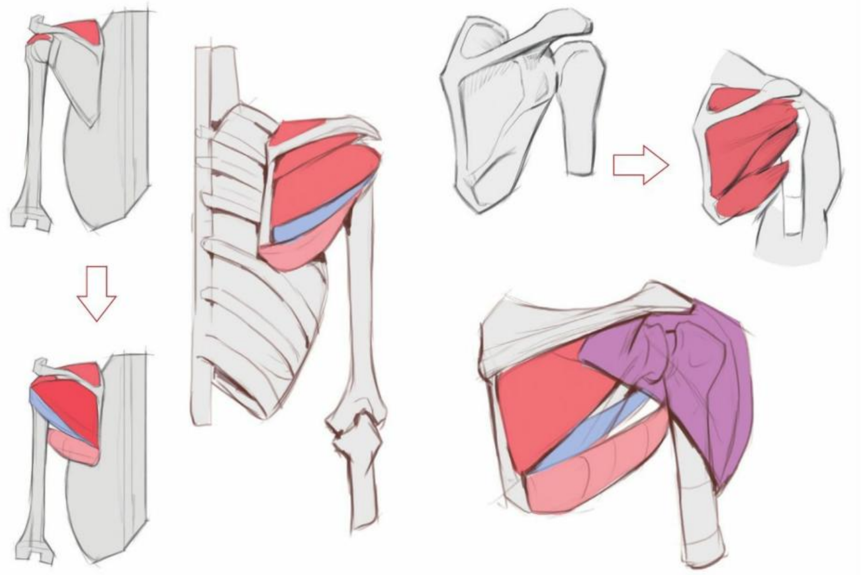

正面



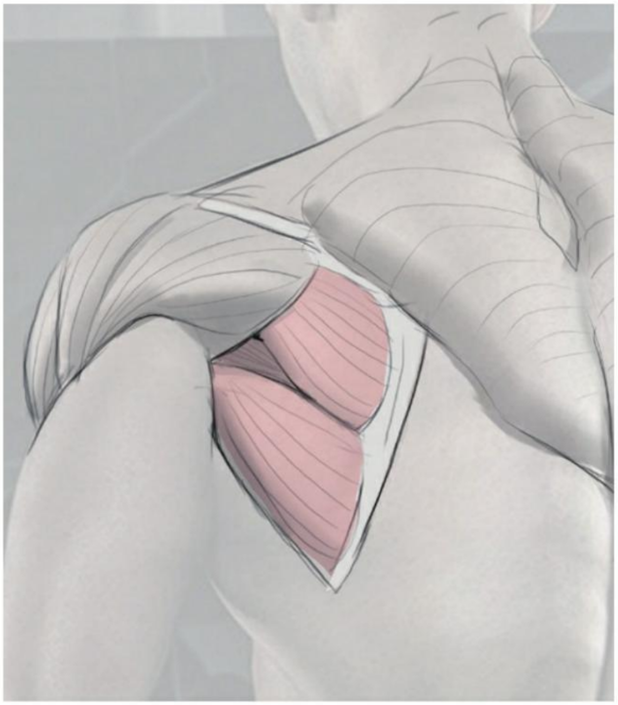
The shoulder blades and collarbone are connected and surround the ribcage, appearing as if they are clamping the chest when viewed from above. cavity.



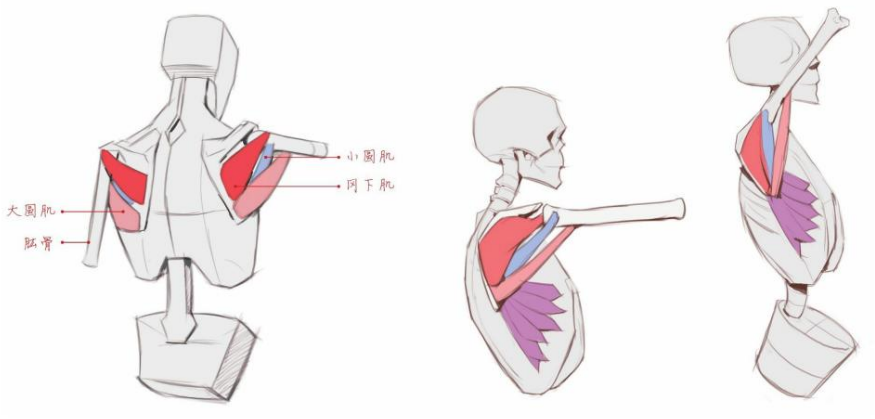
Let's look at the muscle attachments above the scapula. The infraspinatus muscle rotates the arm laterally, stabilizing the shoulder joint and the head of the humerus. The teres major and teres minor muscles hug the arm, twisting against each other as the humerus rotates. The teres major attaches to the medial side of the humerus, and the teres minor attaches to the lateral side.



The following diagram illustrates the scapular muscle group.



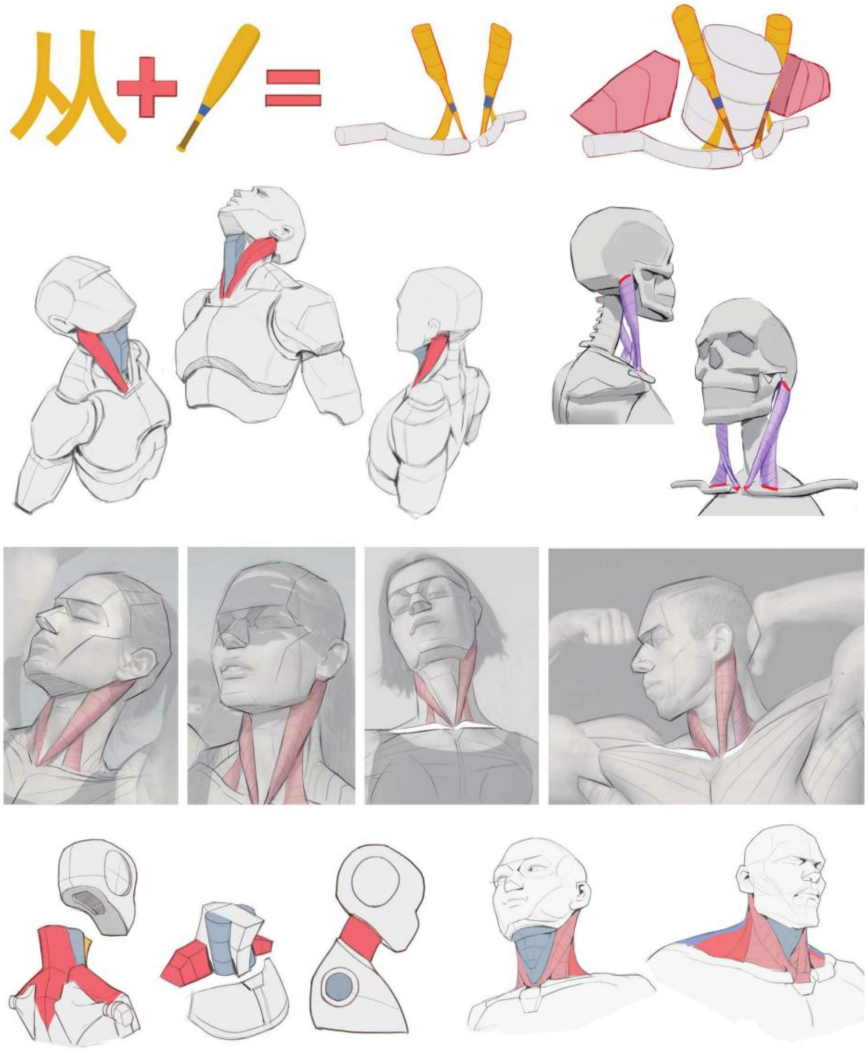
The dynamic changes of the scapula and muscle groups are as follows.



2.4.2 Influence of the sternocleidomastoid muscle on body surface manifestations

The sternocleidomastoid muscle is located on both sides of the neck, mostly covered by the platysma muscle. It originates from the manubrium of the sternum and the sternal end of the clavicle, where the two heads meet and run obliquely upward and backward, inserting into the mastoid process of the temporal bone. Contraction of one sternocleidomastoid muscle flexes the head to the same side and turns the face to the opposite side; simultaneous contraction of both sternocleidomastoid muscles...

It allows the head to tilt backward. In daily life, the movements of tilting our heads up and turning our necks are formed by the contraction and extension of the sternocleidomastoid muscle.

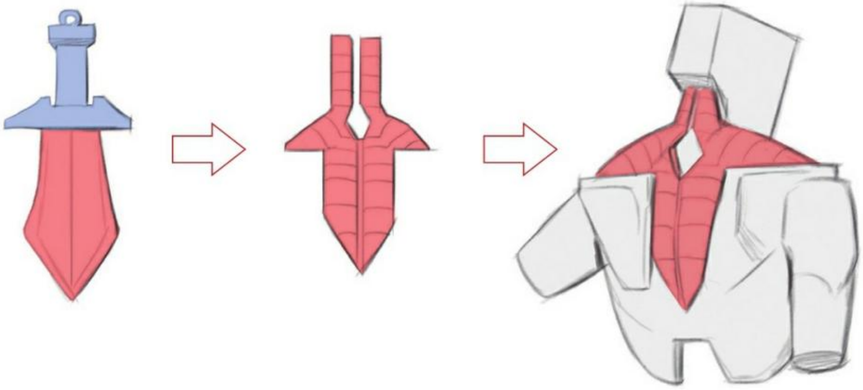


2.4.3 The Influence of the Trapezius Muscle on Body Surface Appearance

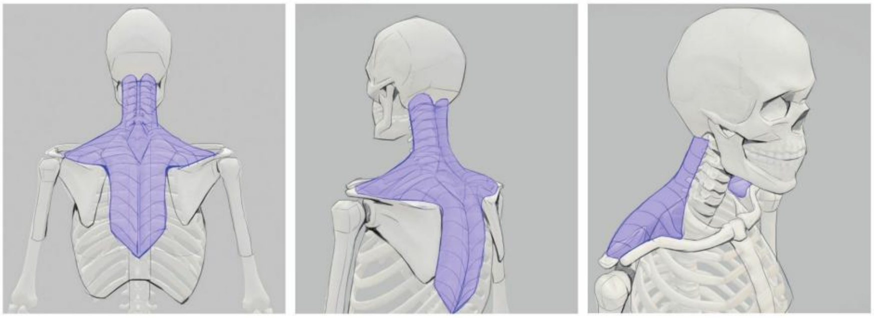
The rotation, elevation, and pull of the scapula are mainly controlled by the trapezius muscle, which originates from the base of the skull. The trapezius muscle grows along the lateral third of the clavicle and the upper edge of the scapula, inserting at the spinal tuberosity. Simplifying the trapezius muscle into a dagger shape, the

handle is the base of the skull, and the sides are the scapulae.

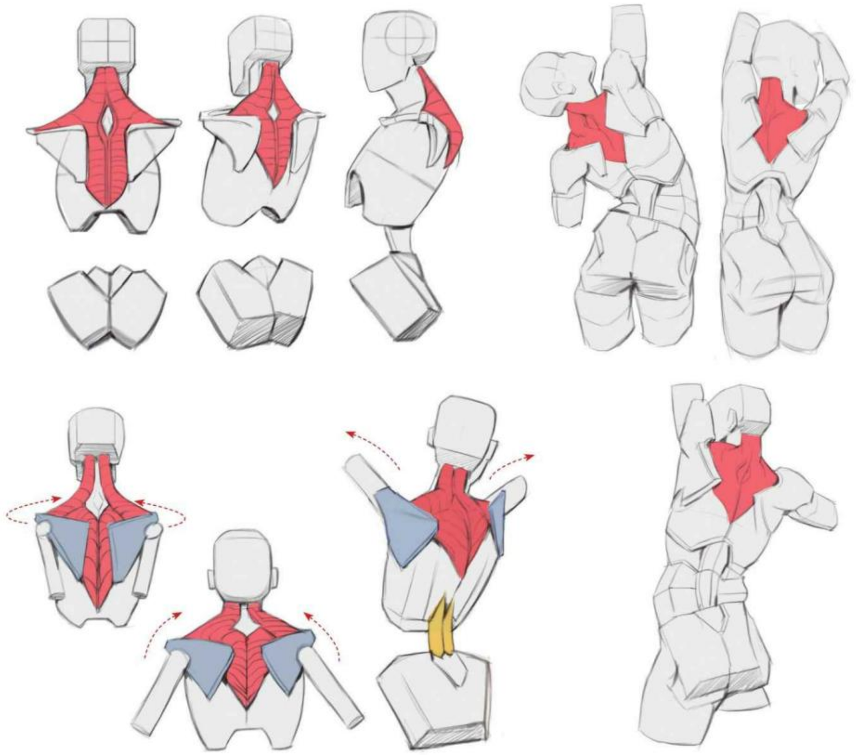
The bony protuberance of the muscle, and the blade runs vertically downwards along the spine.

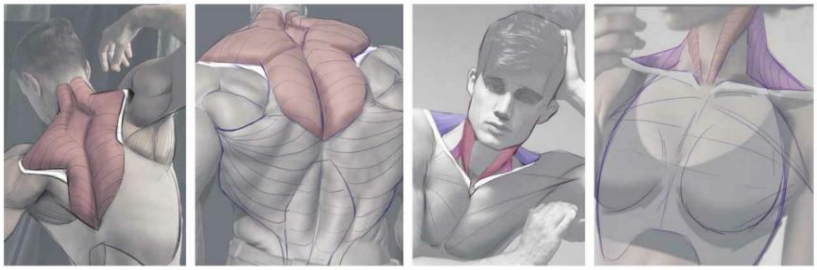


The trapezius muscle connection point is shown below.

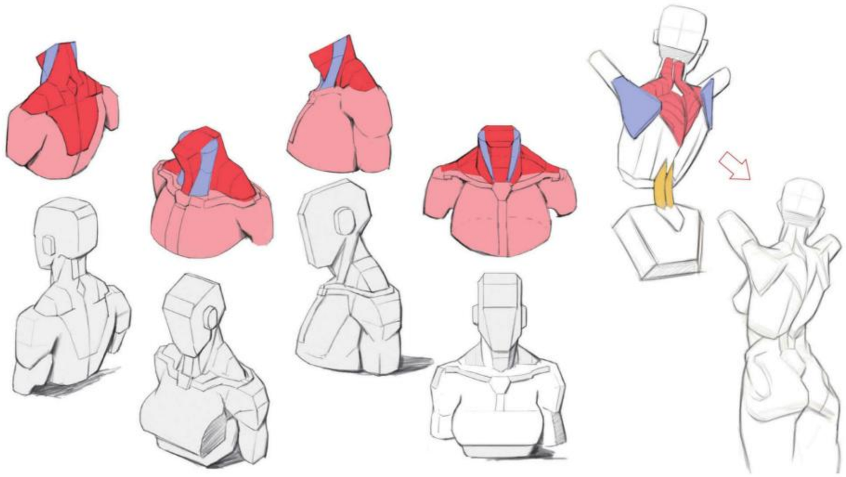


The trapezius muscle is responsible for the movement of the head, neck, and shoulders. The closer the scapulae come together, the more the trapezius muscle contracts and bulges. When the scapulae extend forward, the trapezius muscle becomes thinner and pulls on the ribs below.





The relationship between the neck and shoulder structures is illustrated below.



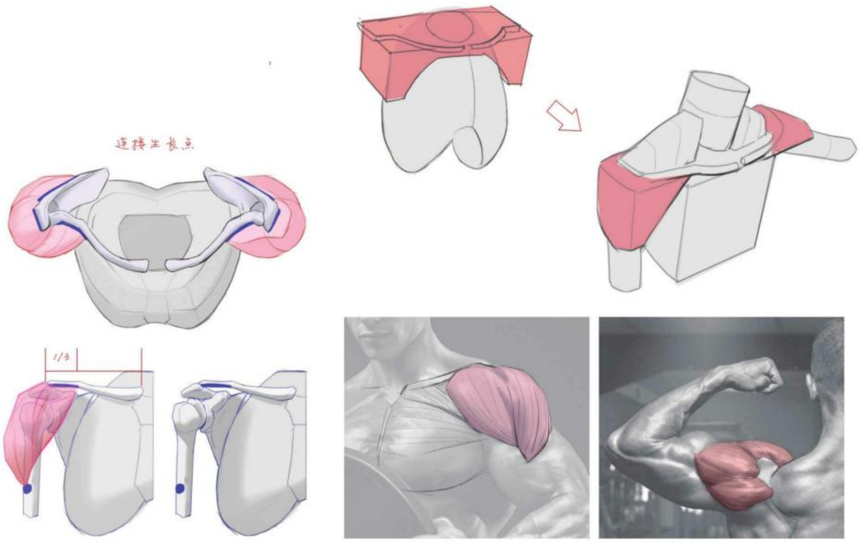
2.4.4 The Influence of the Deltoid Muscle on Body Surface Appearance

The anatomical analysis of the deltoid muscle is as

follows: Location: Subcutaneous region of the shoulder, shaped

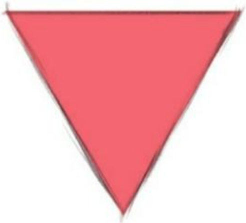
like an inverted triangle. Origin: Lateral half of the clavicle, acromion, and

scapular spine. Insertion: Deltoid tuberosity of the humerus.

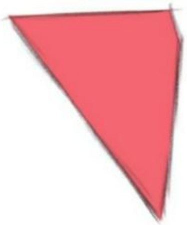


Functions: When the proximal end is fixed, contraction of the anterior fibers flexes, horizontally flexes, and internally rotates the shoulder joint; contraction of the middle fibers abducts the shoulder joint; and contraction of the posterior fibers extends, horizontally extends, and externally rotates the shoulder joint. When the distal end is fixed, overall contraction abducts the

shoulder joint. Viewed from the side, the deltoid muscle resembles an inverted triangle; it also appears triangular when viewed from the front or back.

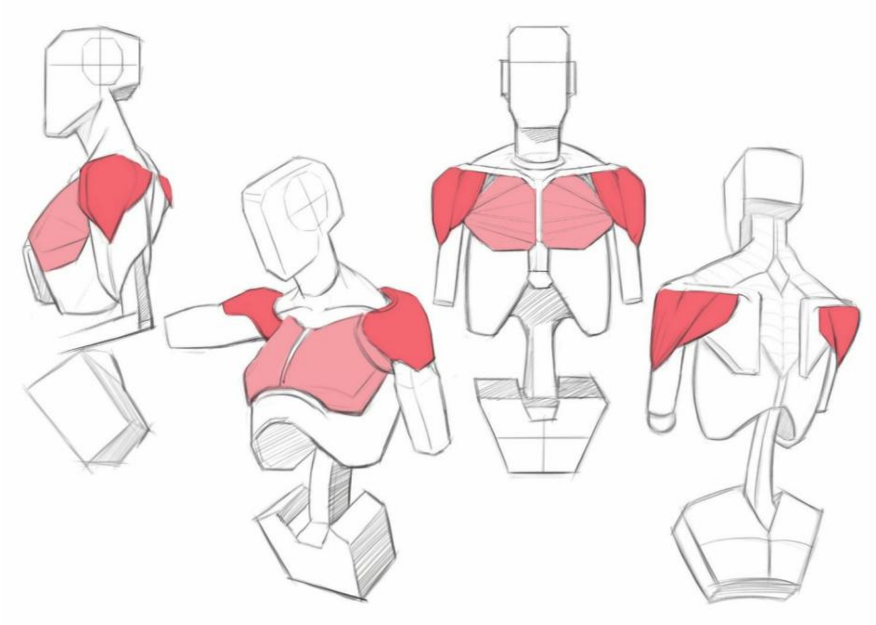


正面

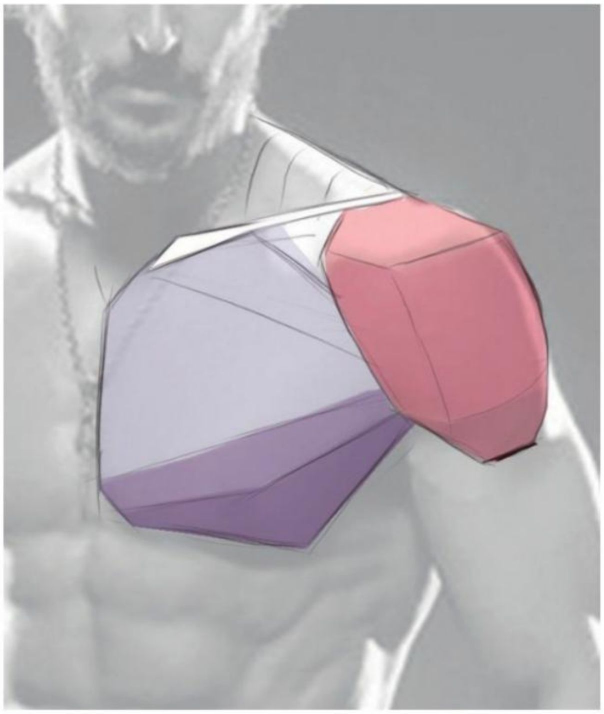


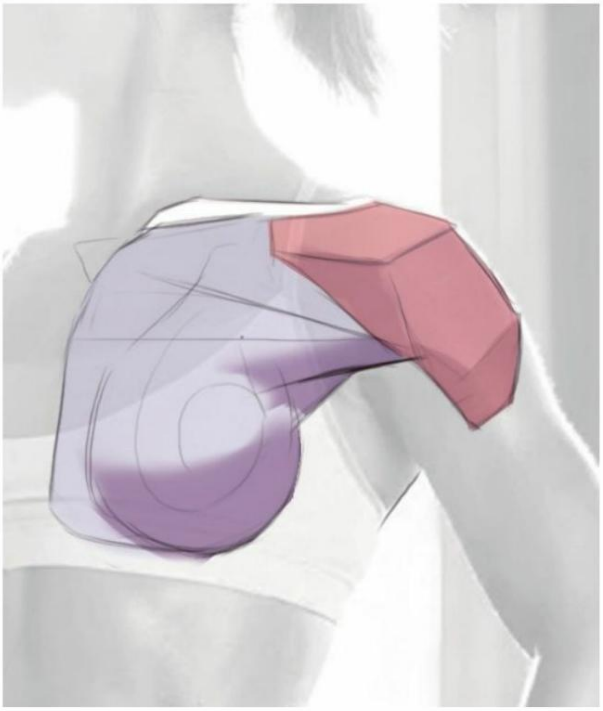
侧面

The deltoid muscle structure is illustrated below.

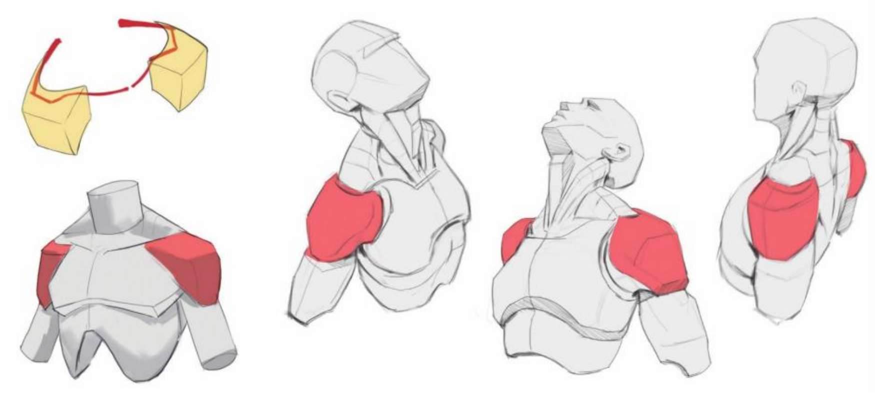


The structure of the deltoid muscle of the trunk at different angles is shown below.

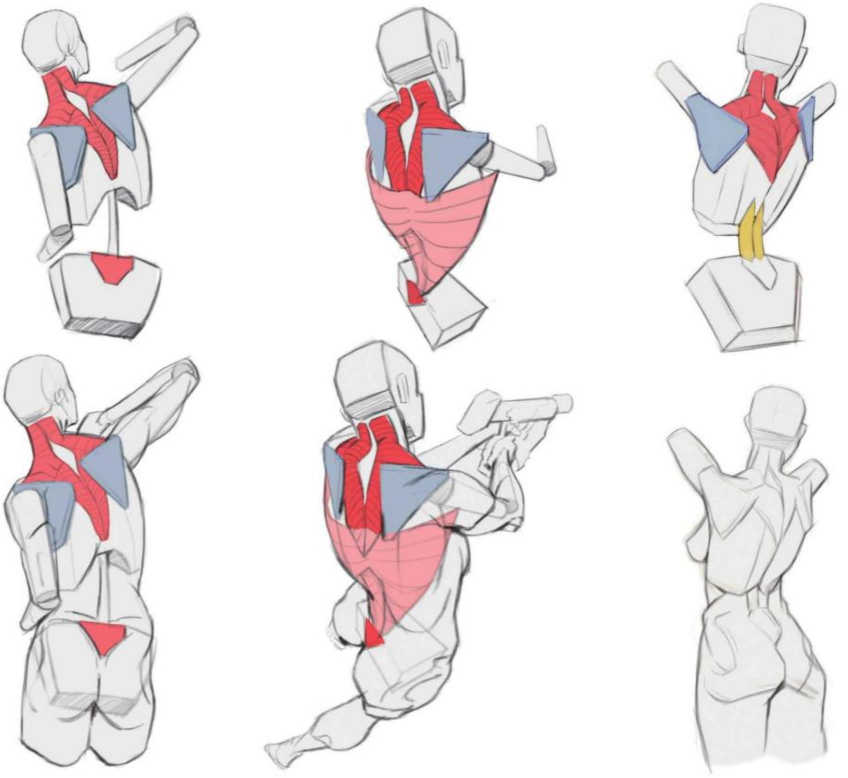




The dynamic structure of the deltoid muscle is as follows.

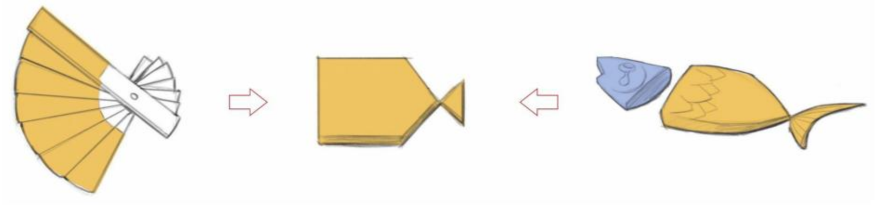


The dynamic structure of the deltoid muscle in the back is shown below.



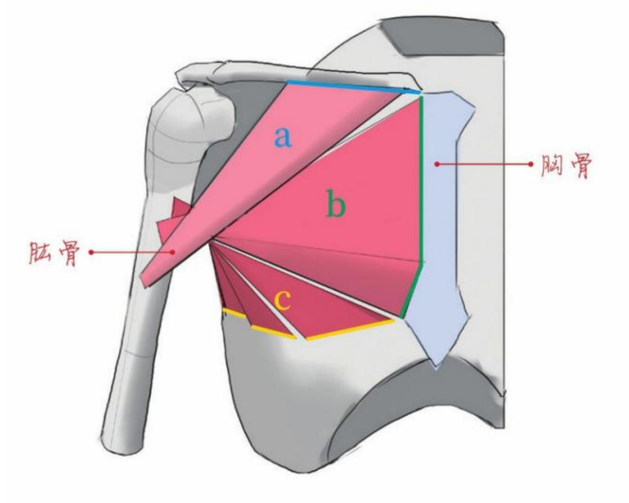
2.4.5 The Influence of the Pectoralis Major Muscle on Body Surface Appearance

The anatomical analysis of the pectoralis major muscle is as follows.

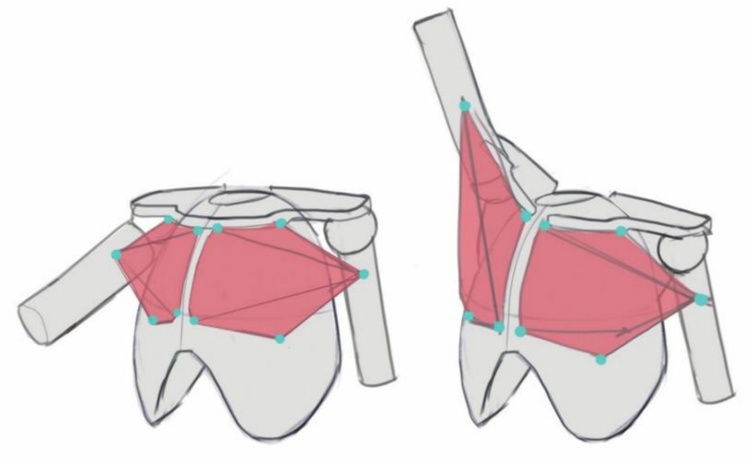


Location: Subcutaneous tissue in the upper chest.

Origin: a. 3/5 of the clavicle; b. sternum; c. ribs. Insertion: crest of the greater tubercle of the humerus.



The connection point of the pectoralis major muscle is shown below.

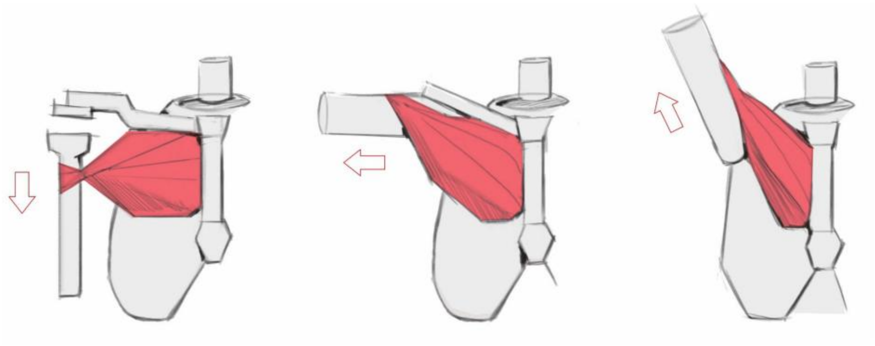


Function: When the proximal end is fixed, it enables flexion, horizontal flexion, adduction, and internal rotation of the shoulder joint; when the distal end is fixed, Pull your torso towards your upper arms and lift your ribs to help you inhale.

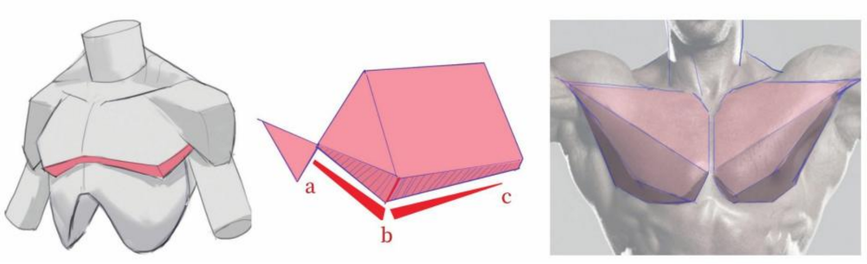
When drawing the pectoralis major muscle, we can imagine it as a fan, or a headless muscle.

Fish, in this way, can better understand the structure of the pectoralis major muscle and the interlocking relationships of the muscles.

The following diagram illustrates the rotational contraction and stretching of the pectoralis major muscle as the arm is raised.



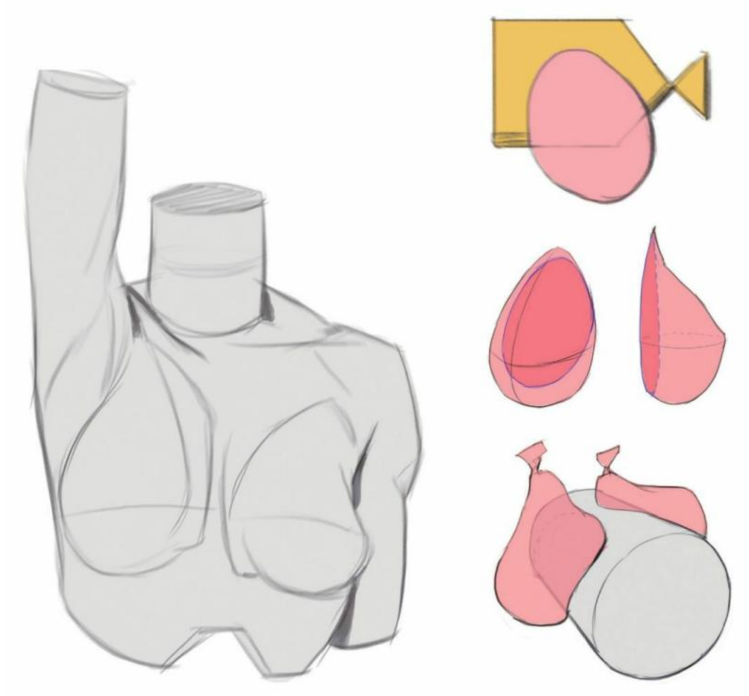
The three-dimensional geometric representation of the pectoralis major muscle is shown below.



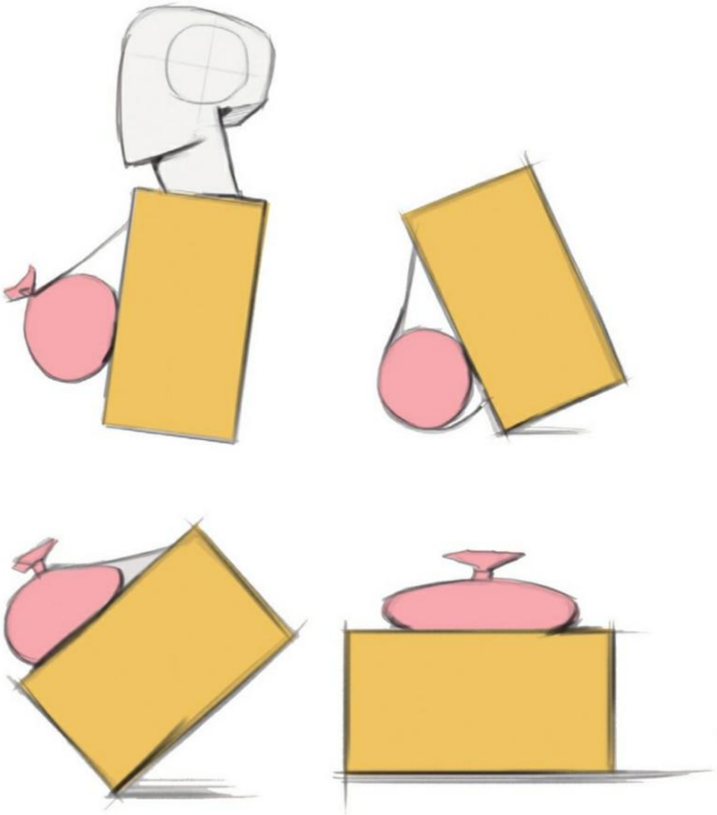
The thickest part of the chest

When drawing a woman's breasts, many people mistakenly consider the breast and pectoralis major muscle as one part.

Actually, the two are separate; the breast grows on top of the pectoralis major muscle.

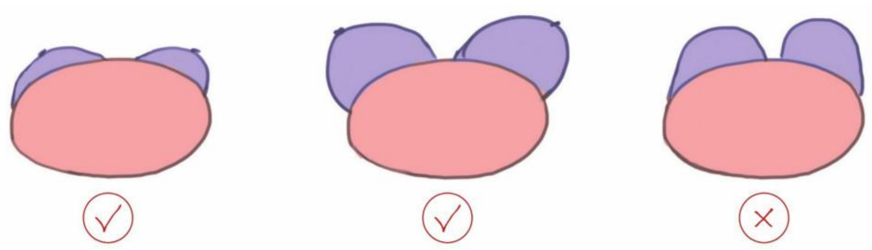


When women exercise, the shape of their breasts changes due to gravity and compression.

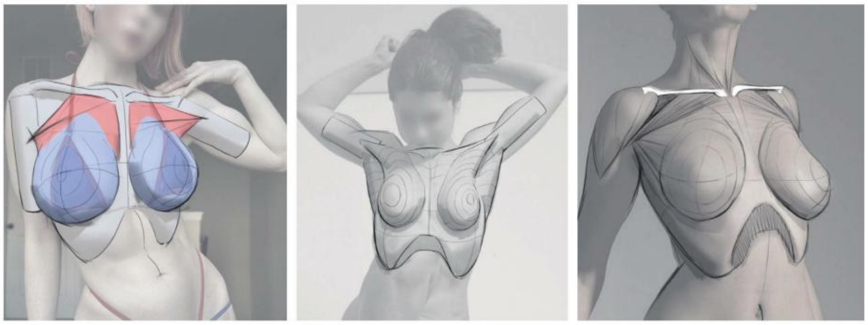


When depicting the chest, one should not only pay attention to the fact that the chest is attached to the thoracic cavity, but also to the chest itself...

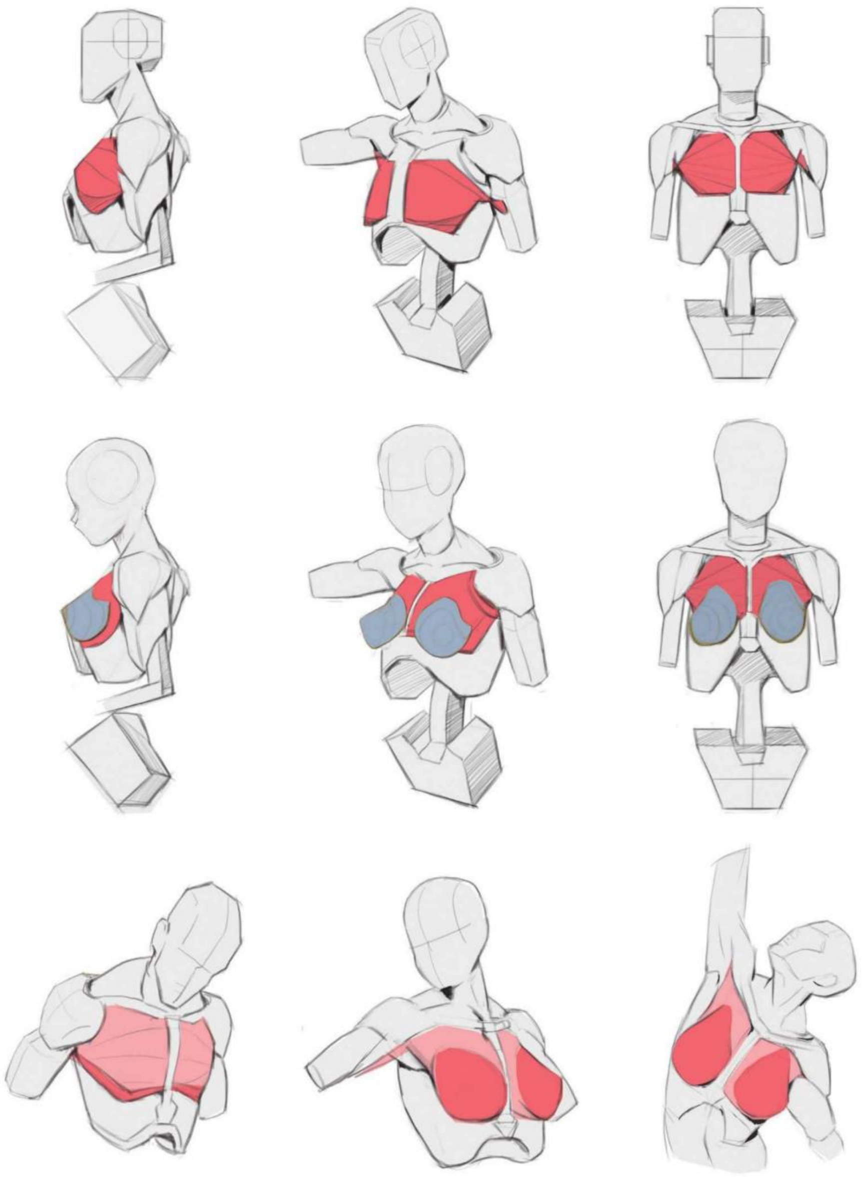
The direction of the outline.



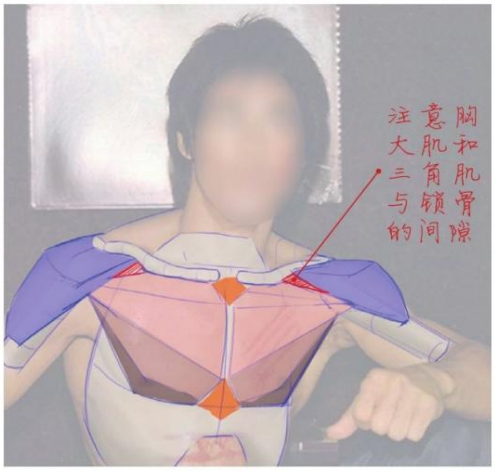
The chest volume structure is illustrated below.

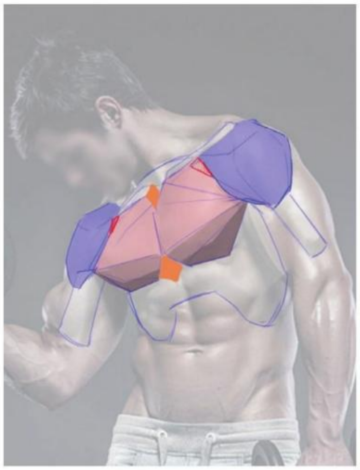


The pectoralis major muscle structure of the torso at different angles is shown below.

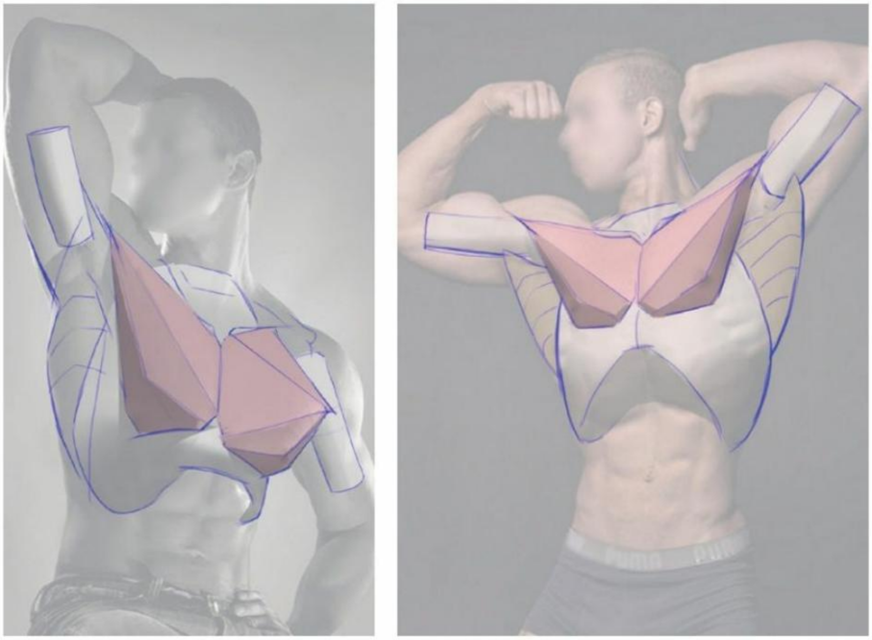


The basic muscle structure is illustrated below.





The muscle changes are illustrated below.



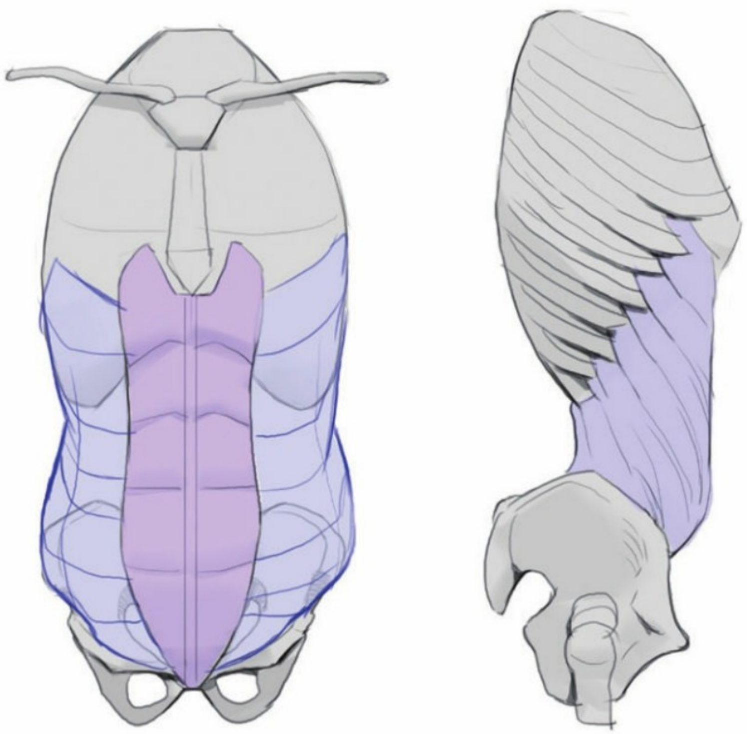
2.4.6 Influence of the external oblique muscle on body surface appearance

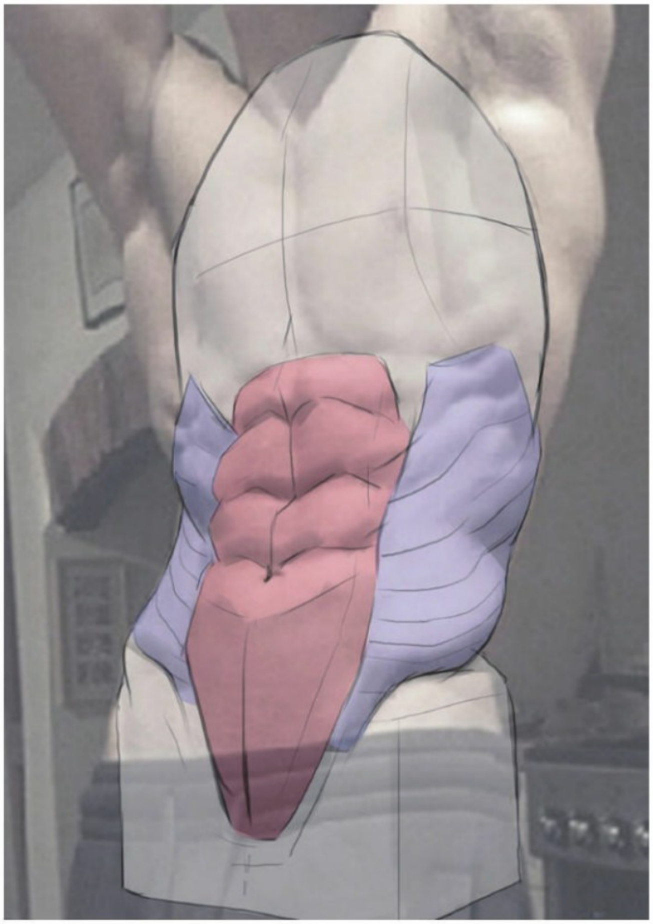
The anatomical analysis of the external oblique muscle is

as follows: Location: Superficial layer of the anterolateral abdominal wall; muscle fibers run obliquely from the superior

lateral to the inferior anteromedial. Origin: Lateral surfaces of

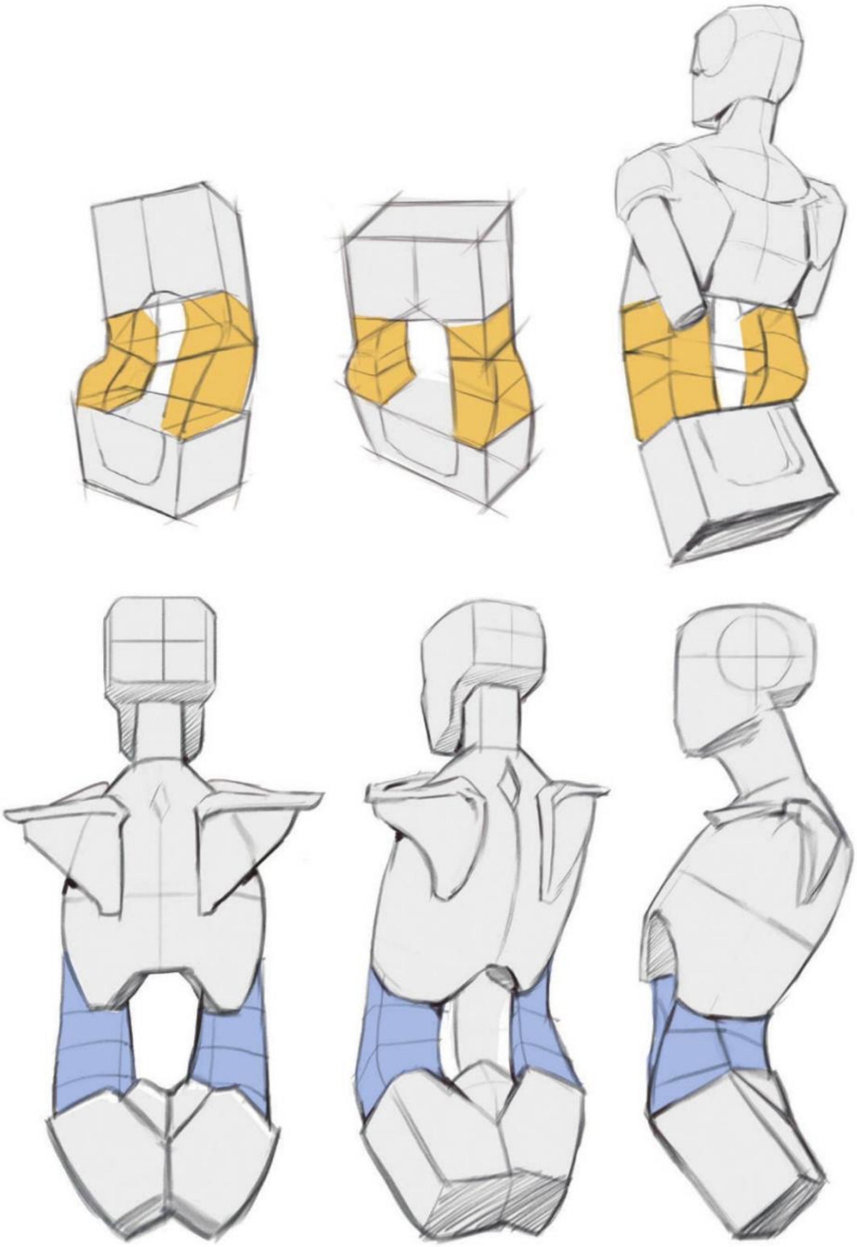
the 5th to 12th ribs. Insertion: Iliac crest, pubic tubercle, and linea alba; its aponeurosis contributes to the anterior wall of the rectus abdominis sheath.



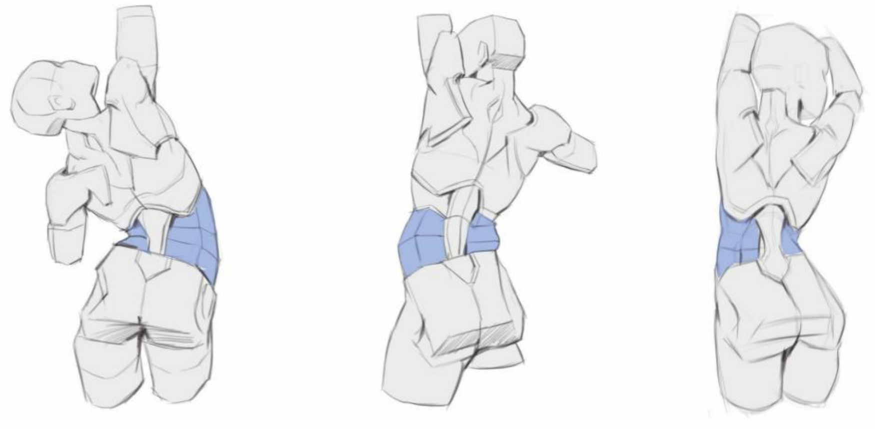


Function: When the upper part is fixed, contraction on both sides causes the pelvis to tilt backward; when the lower part is fixed, contraction on one side causes the spine to flex laterally to the same side and rotate to the opposite side. Contraction on both sides can flex the spine and lower the ribs to assist exhalation.

When drawing the external oblique muscles, we can imagine them as two rectangular pieces of gummy candy, with the thoracic cavity supported on the pelvis.

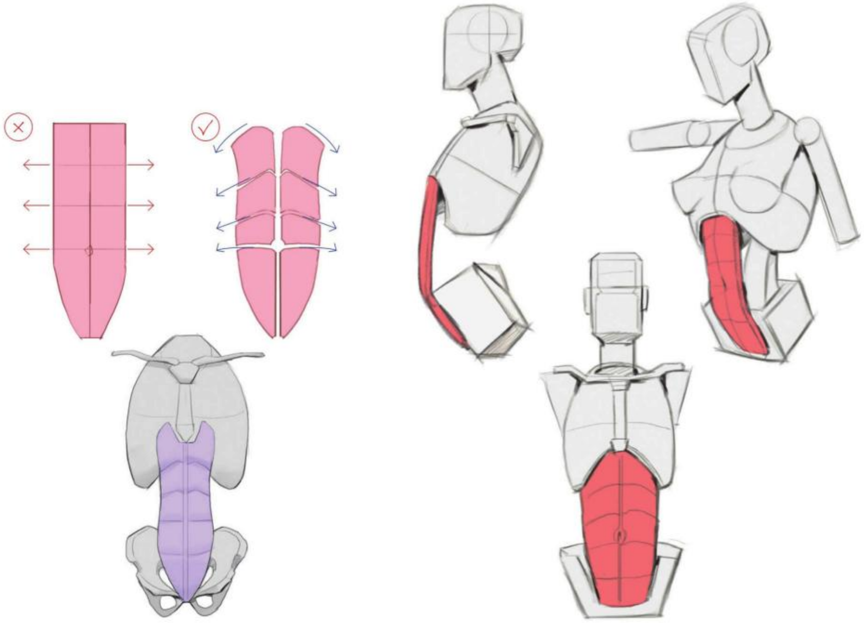


When performing twisting movements, remember that the thickness of the external oblique muscle remains constant as it twists.



2.4.7 The Influence of the Rectus Abdominis on Body Surface Appearance

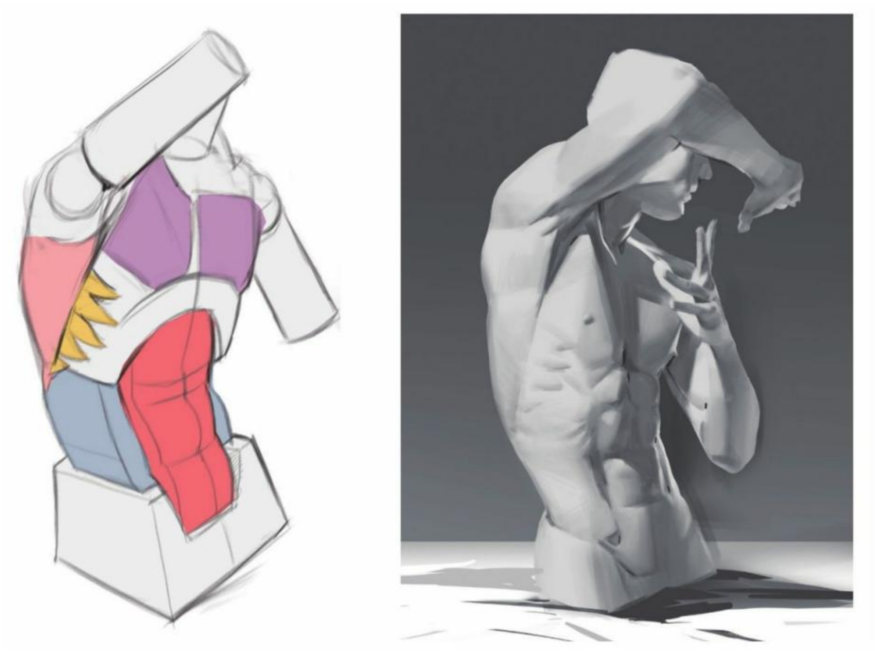
The anatomical analysis of the rectus abdominis muscle is as follows: Location: On both sides of the midline of the anterior abdominal wall. Origin: Superior border of the pubis. Insertion: Xiphoid process of the sternum and anterior surface of the 5th to 7th costal cartilages.



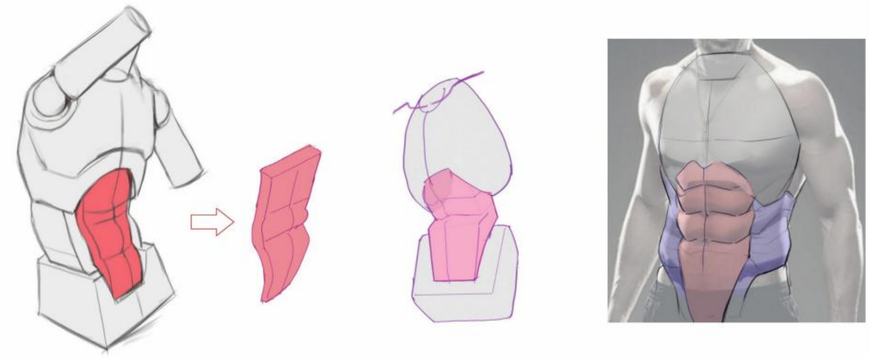
Function: When the upper part is fixed, the contraction on both sides causes the pelvis to tilt backward; when the lower part is fixed, the contraction on one side causes the spine to flex to the same side.

The rectus abdominis and external oblique muscles are key muscles supporting waist twisting. During twisting, these two muscle groups...

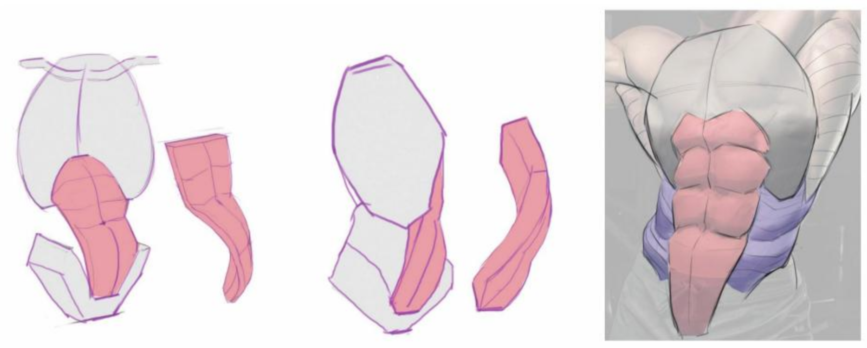
The shape changes that occur when meat is squeezed and stretched are very obvious.



Basic analysis of muscle shape



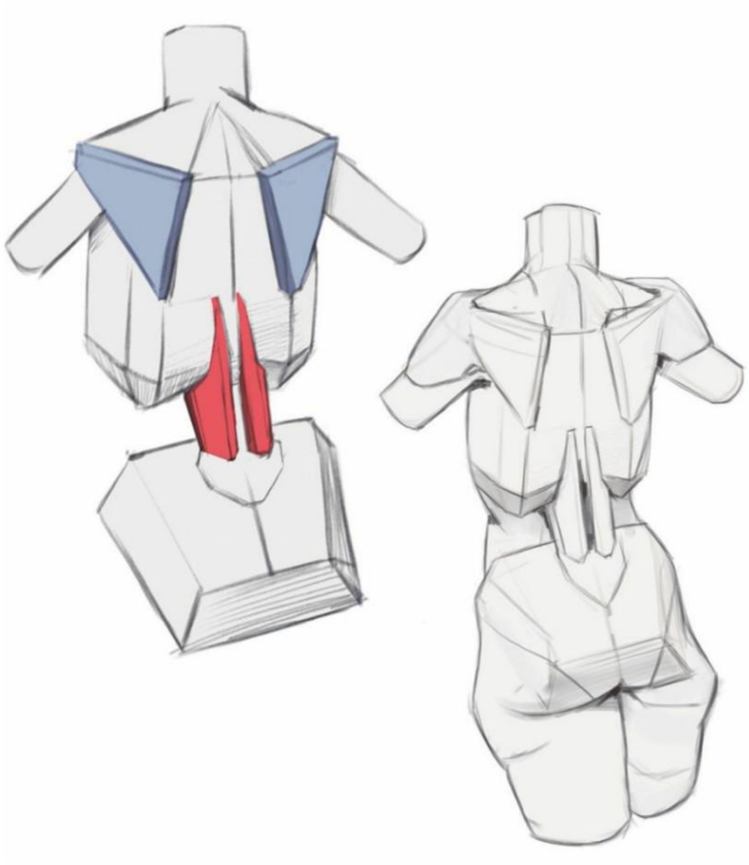
Changes in muscle shape during rectus abdominis compression



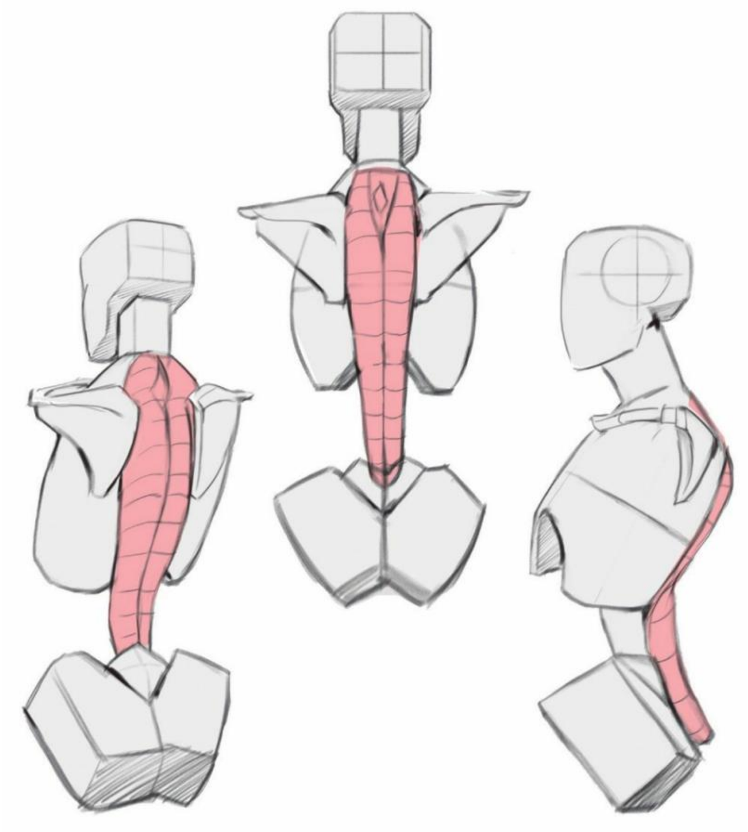
Changes in muscle shape when the rectus abdominis twists to the left and right.

2.4.8 Effects of the erector spinae muscles on body surface appearance

The erector spinae muscles are a group of muscles that extend from the head to the sacrum. They are the middle layer of the back muscles and are involved in the bending and rotation of the trunk.



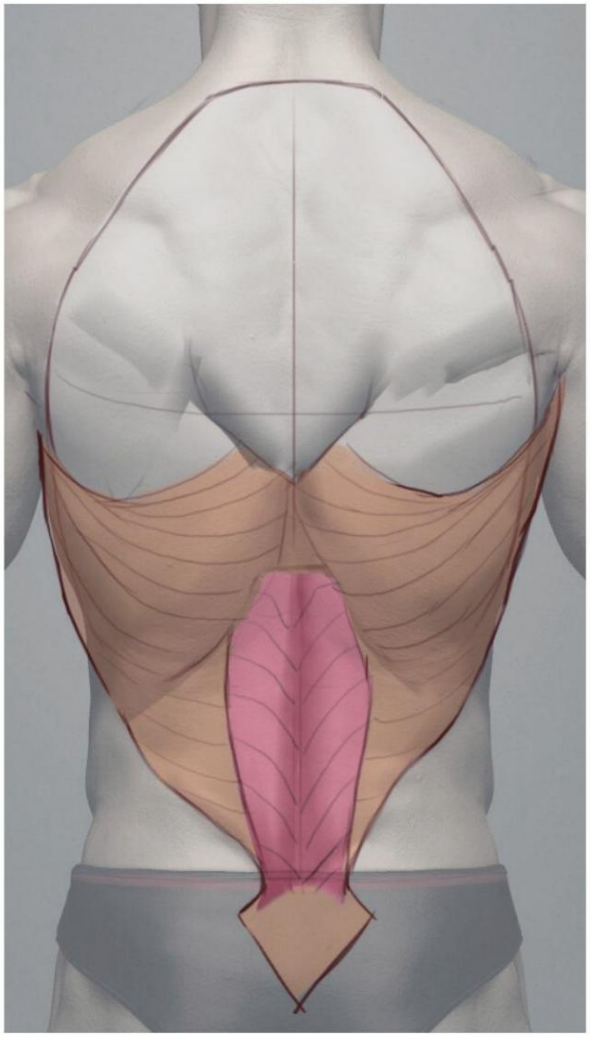
The erector spinae muscles can be simplified as two sausages side by side.



hint

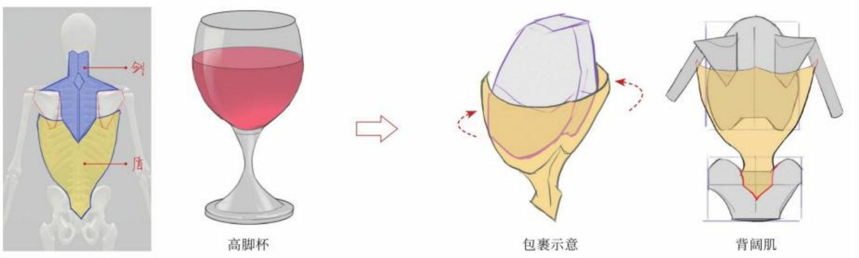
When depicting the three-dimensionality of the erector spinae muscles, one should follow the perspective between the spine, thoracic cavity, and pelvis.

Visualize the relationship between volumes.

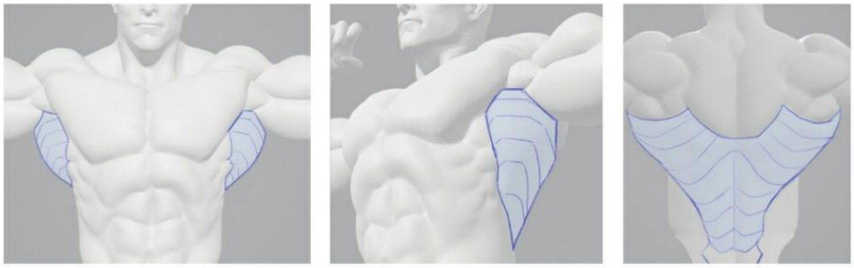


2.4.9 The Influence of the Latissimus Dorsi Muscle on Body Surface Appearance

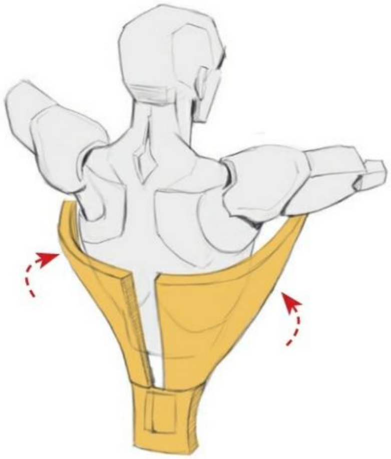
We can remember the latissimus dorsi and trapezius muscles by associating them: the trapezius is like a sword, and the latissimus dorsi is like a... The shield. When drawing the latissimus dorsi muscle, note that it is wrapped around the chest cavity.

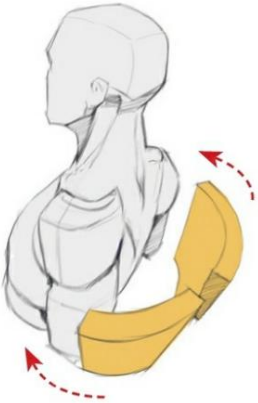


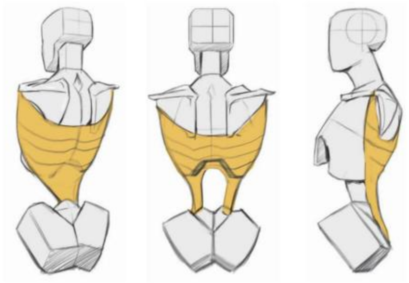
The latissimus dorsi is a key muscle for pulling down the arms and lifting the body, and it adducts, extends, and rotates the humerus. The latissimus dorsi originates from the sixth thoracic vertebra and the iliac crest, inserting into the anterior end of the humerus.

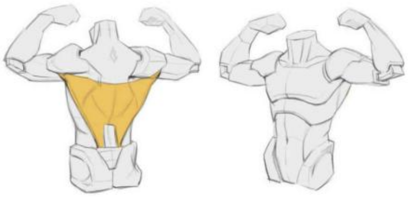


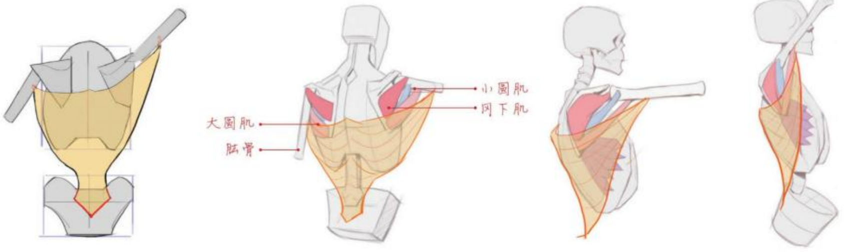
Imagine the latissimus dorsi muscle as a triangle that encloses the chest cavity, with the two apexes of the triangle inserting into the front of the humerus.





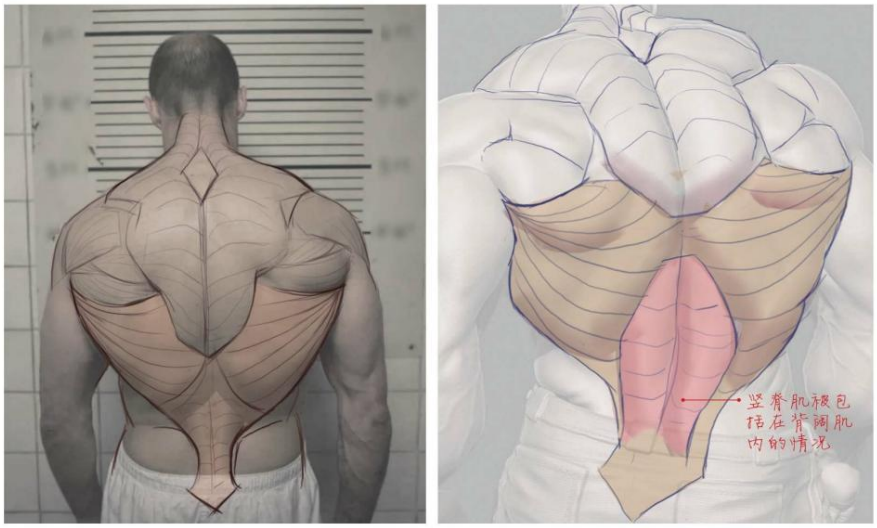






Schematic diagram of the changes in the latissimus dorsi muscle during movement.

The following diagram illustrates different styles of latissimus dorsi muscle development.



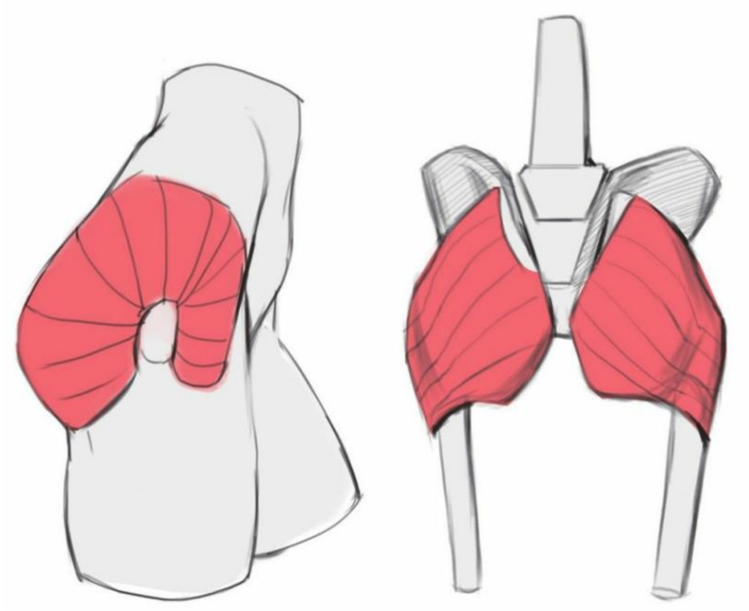
hint

The teres major muscle is wrapped by the latissimus dorsi muscle.

2.4.10 The Influence of the Gluteus Maximus on Body Surface Appearance

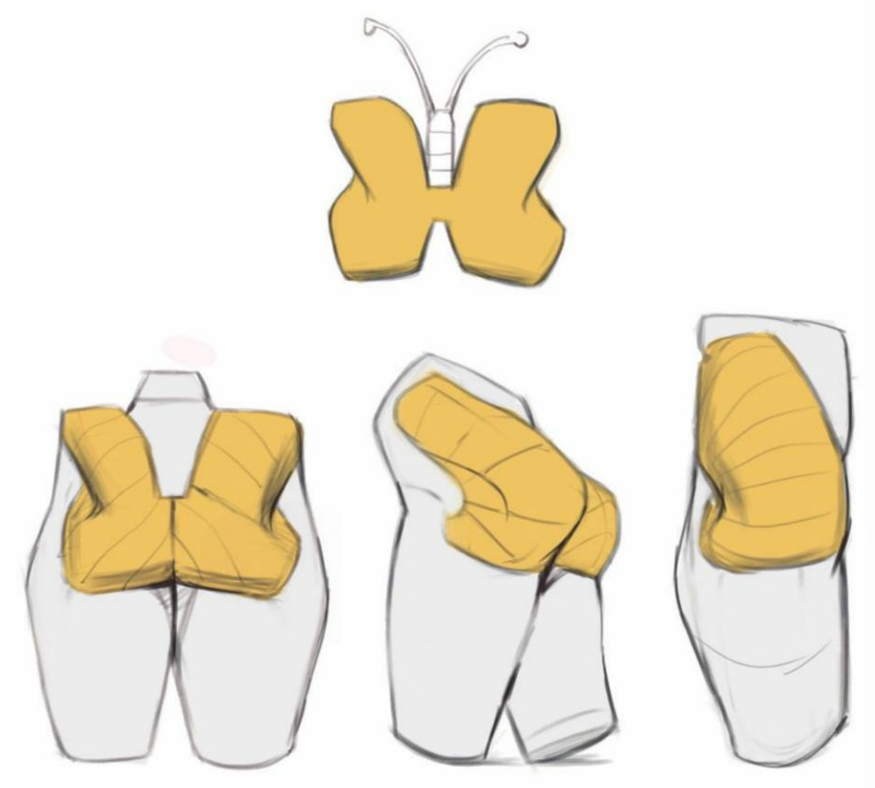
The gluteus maximus is a broad, square muscle located under the skin of the buttocks, originating from the outer surface of the iliac wing and the dorsal surface of the sacrum.

The fibers run obliquely downward and outward, covering the greater trochanter and inserting into the gluteal tuberosity of the femur.

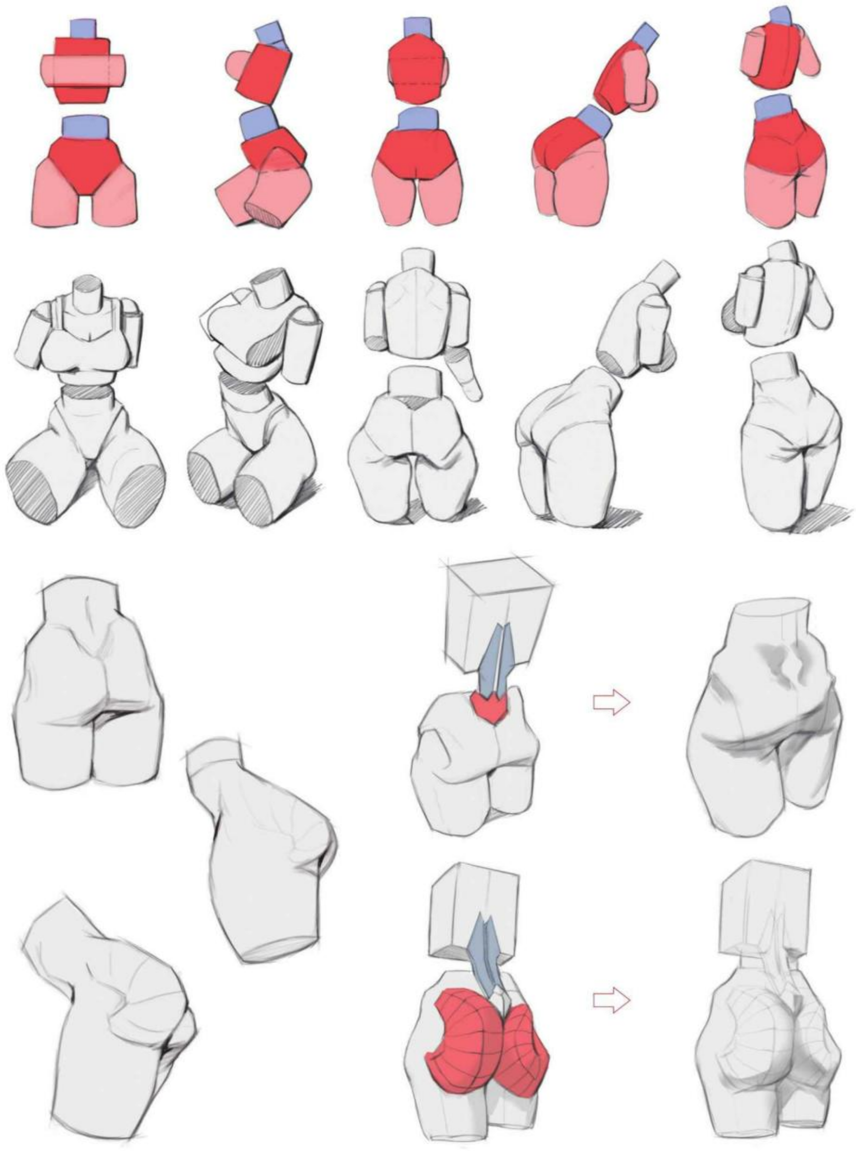


From the back, the buttocks resemble a butterfly; from the side, they look like a croissant wrapping around a large...

leg.



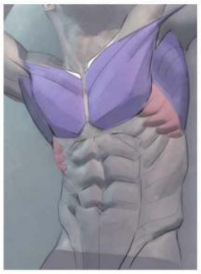
The structure of the gluteus maximus is shown below.

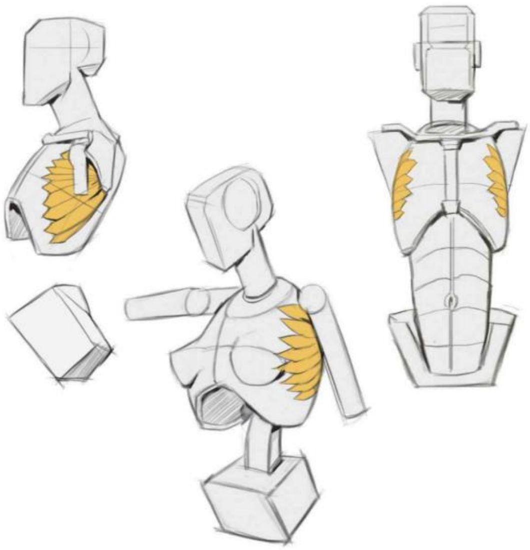


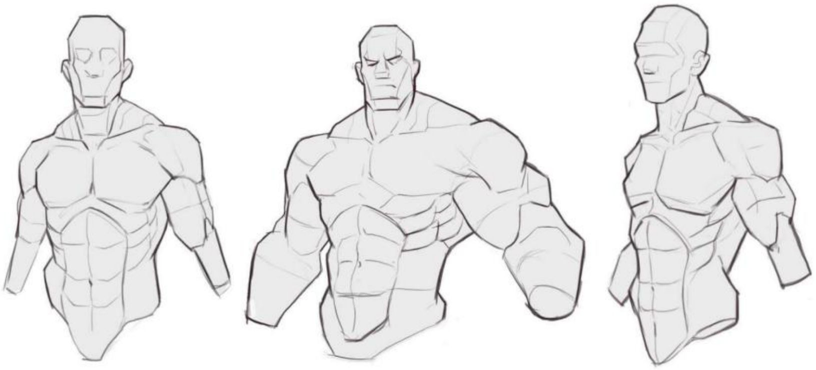
2.4.11 Effects of the serratus anterior muscle on body surface appearance

Location: Superficial layer of the lateral aspect of the thorax. Origin: Lateral surface of the 8th-9th ribs. Insertion: Anterior to the medial border and inferior angle of the scapula. Function: When the proximal end is fixed, it protracts the scapula; when the distal end is fixed, contraction of the lower muscle fibers depresses and upwardly rotates the scapula. The serratus anterior muscle can be simplified into a fan-shaped shell, like a hand embracing the thoracic cavity, which makes it easier to...

In memory.







2.5 Simplify the trunk mass and muscles

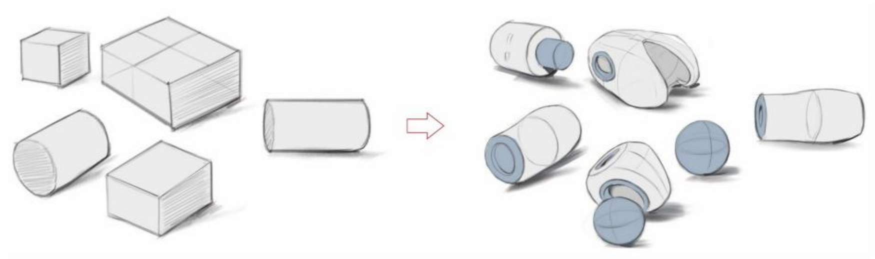
The structure of the human body is very complex. To quickly understand and master it, one needs...

We will simplify the memorization of these structures. This section will introduce the simplification of trunk structure and muscle structure.

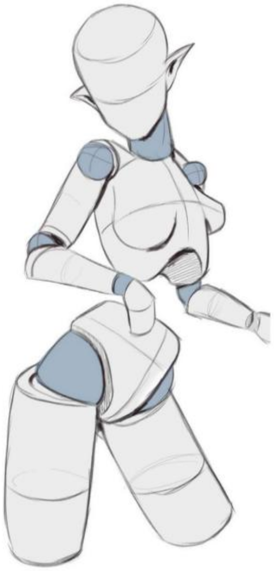
2.5.1 Simplify the trunk block structure

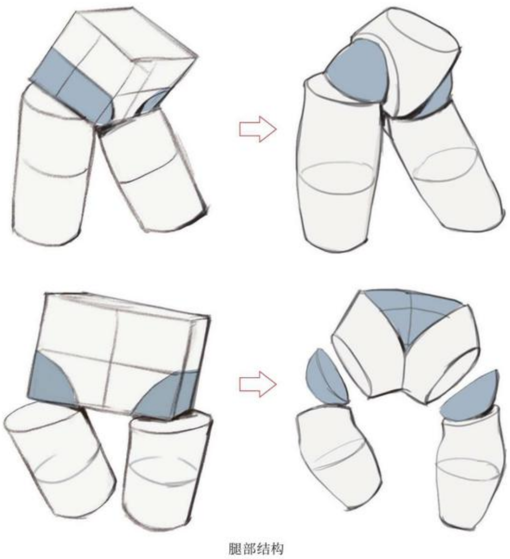
The human body can be viewed as a series of simple structures, which can then be broken down. After disassembly, the individual

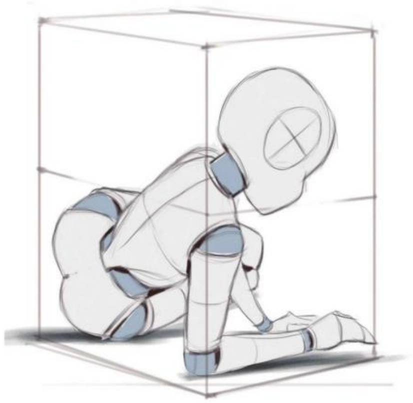
parts can be clearly seen, and these parts are generally connected by spherical structures.

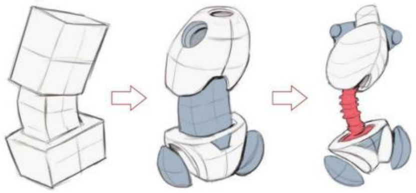


Connect the split blocks, paying attention to the interlocking relationships between them.

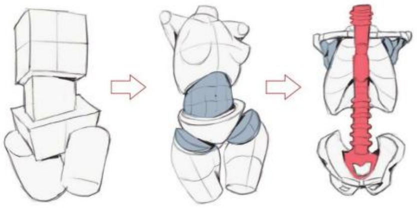








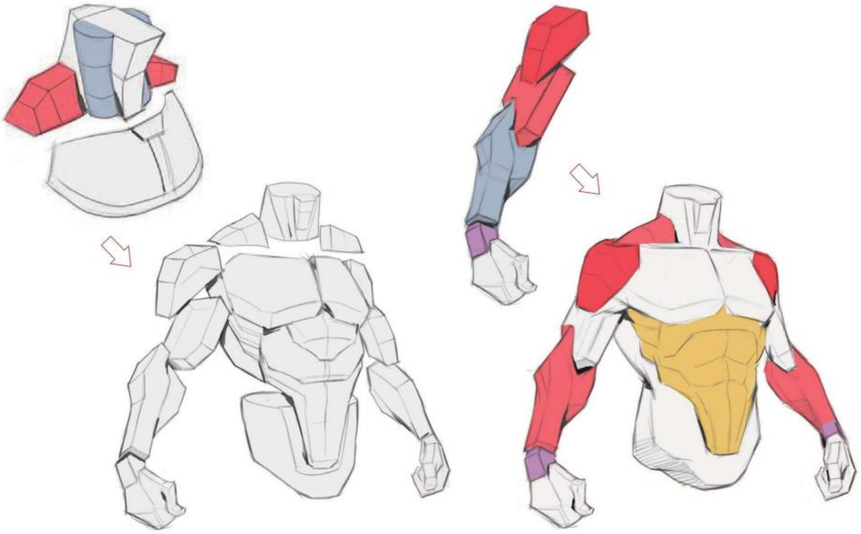
躯干结构（背面）



躯干结构（正面）

2.5.2 Simplify trunk muscle structure

The muscular structure inside the torso can also be broken down into geometric blocks, which is more conducive to strengthening memory. Memorability makes it easier to understand.

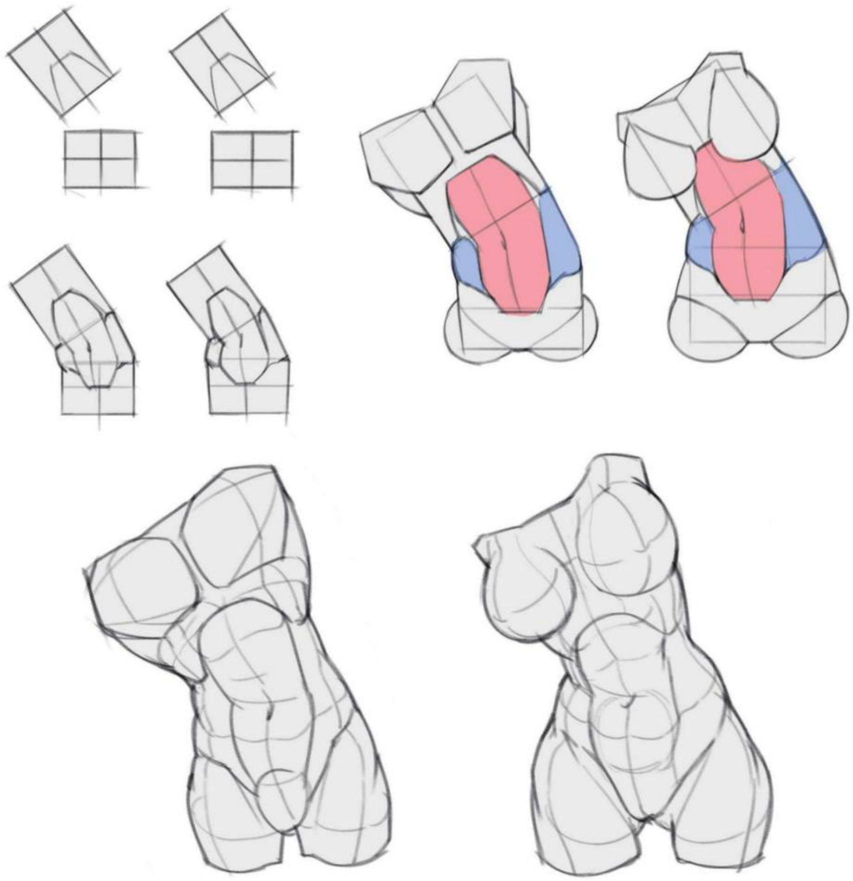


2.6 Torso Twist and Dynamic Performance

Based on the different proportions of male and female torsos, human torso twisting can be divided into four categories: lateral bending, backward bending, forward bending, and lateral rotation. Torso rotation will not exceed the limits of spinal curvature.

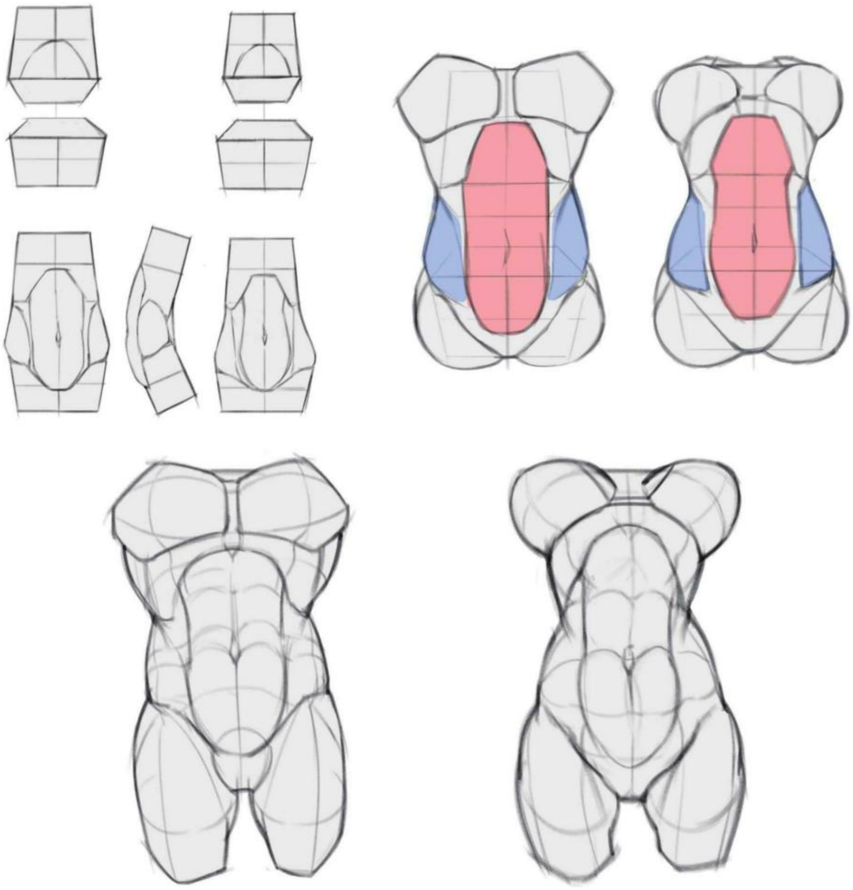
2.6.1 Left and right bending

When drawing a torso that curves left and right, pay attention to the changes in the external oblique and rectus abdominis muscles.



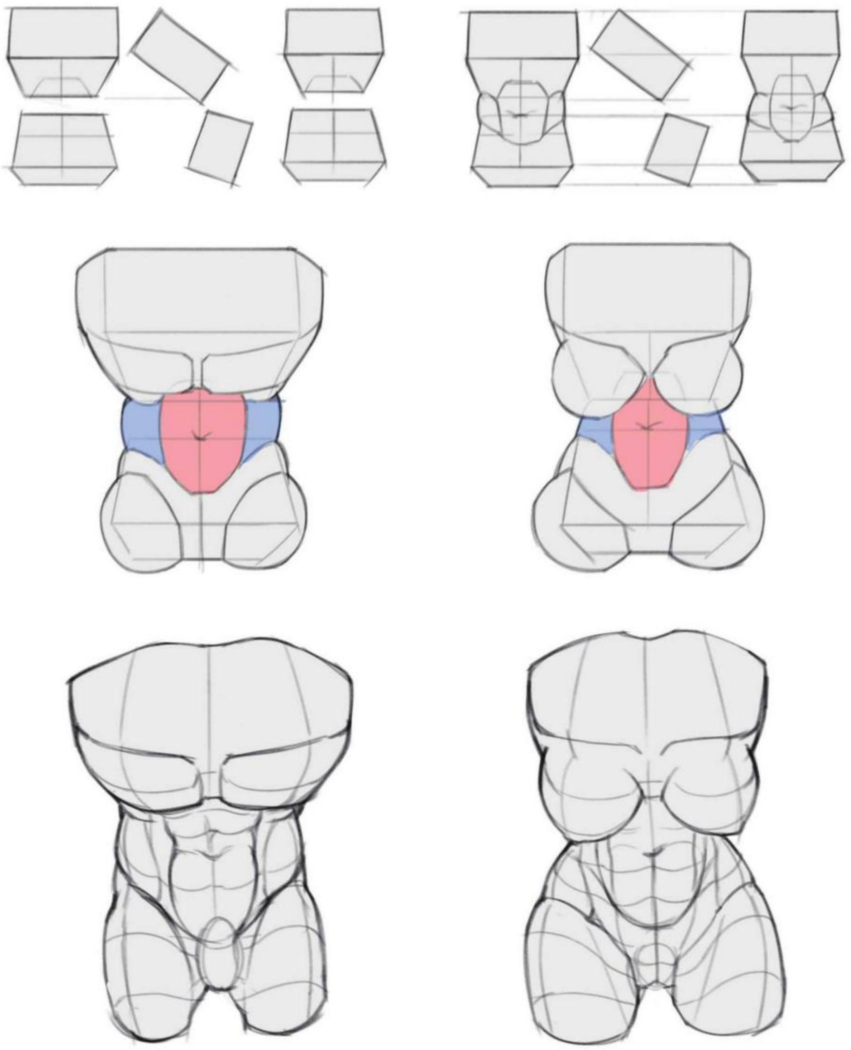
2.6.2 Backward bending

When drawing a torso that bends backward, pay attention to the stretching changes of the rectus abdominis muscle.



2.6.3 Bending forward

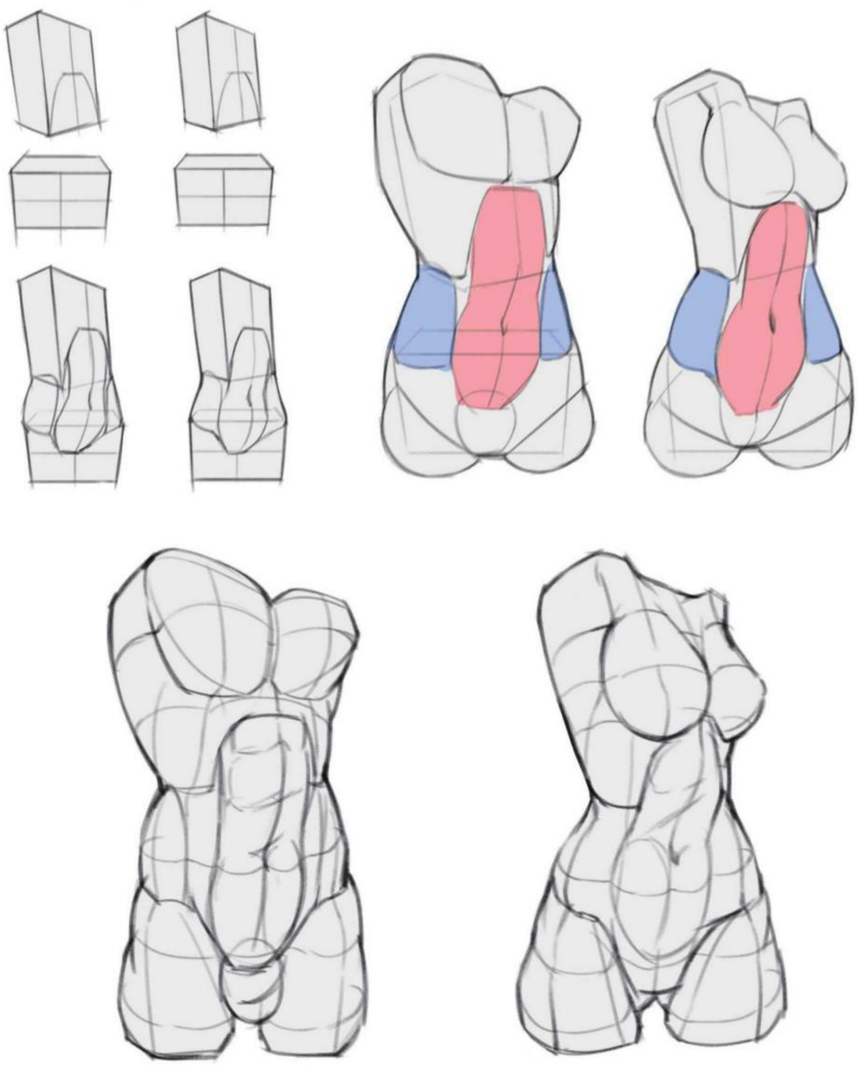
When the torso bends forward, the rectus abdominis muscles contract, making the entire body appear shorter from the front.



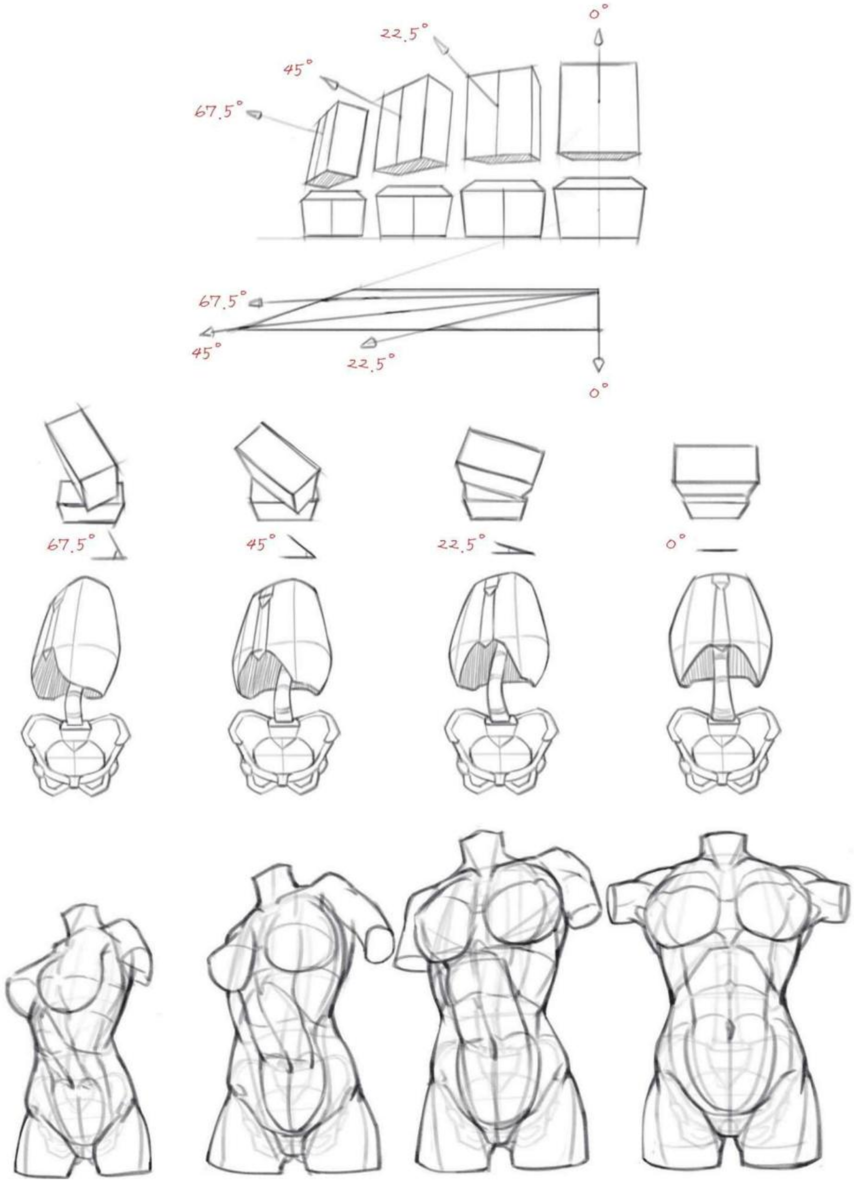
2.6.4 Twist left and right

When the torso twists from side to side, the muscles will twist and stretch; pay attention to the contraction of the external oblique muscles on both sides.

The contrast with stretching, and the slight stretching changes in the rectus abdominis.



When the chest cavity and pelvis twist in opposite directions, note that the range of motion of the chest cavity and pelvis is limited. For example, as shown in the image below, the range of motion of the chest and pelvis should not exceed 60°, otherwise it will appear unnatural.


0°
22.5°
45°
67.5°
67.5°
45°
22.5°
0°
67.5°
45°
22.5°
0°

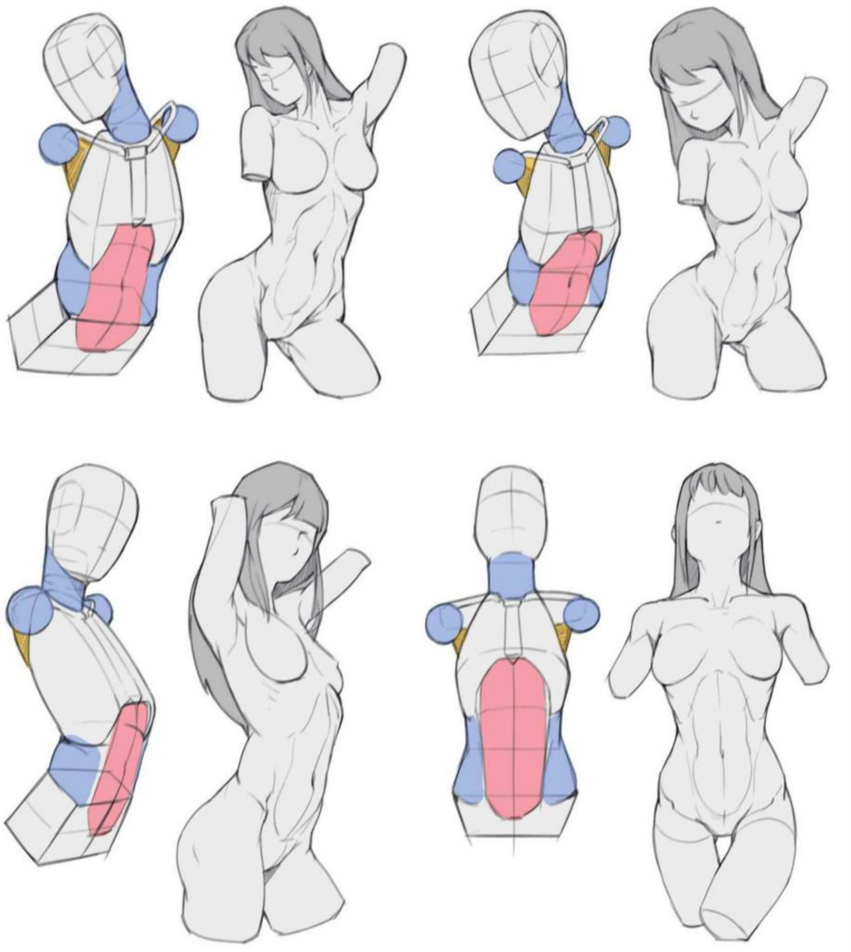
hint

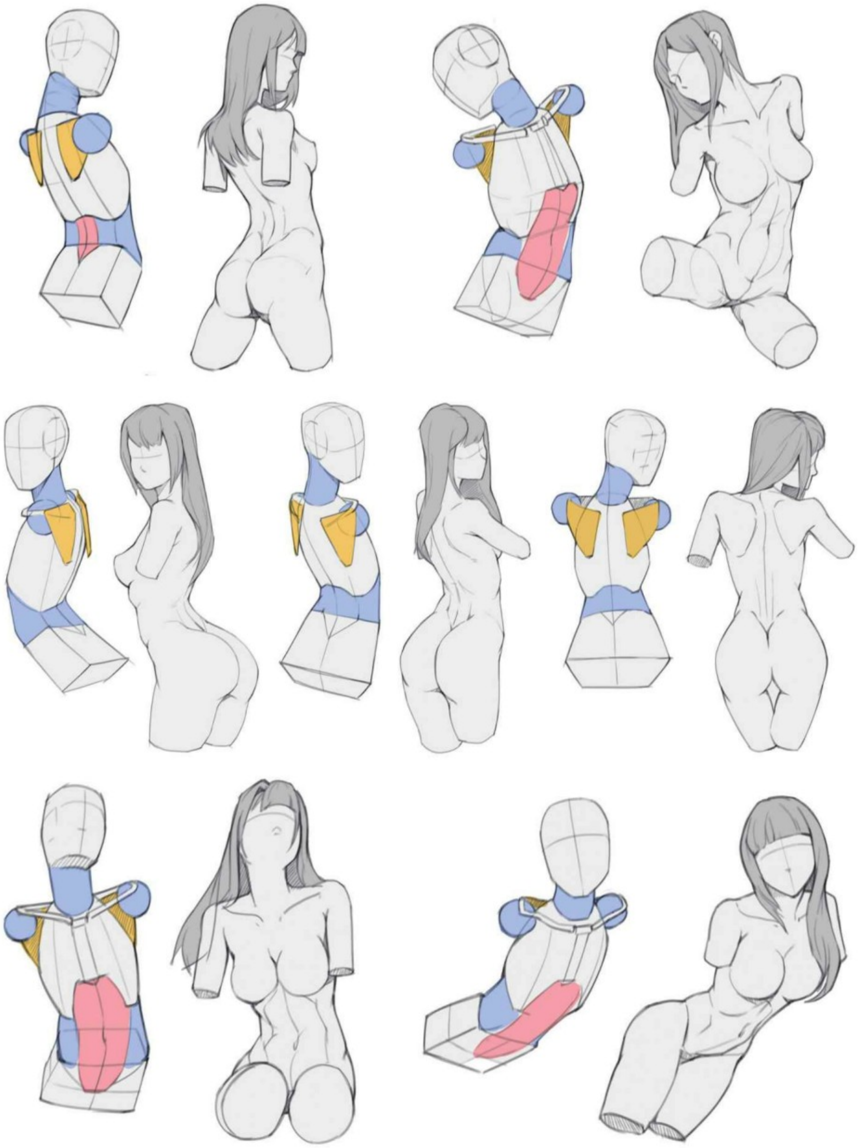
The dynamic twisting of the thoracic cavity and pelvis is also limited and cannot exceed the length of the human spine.

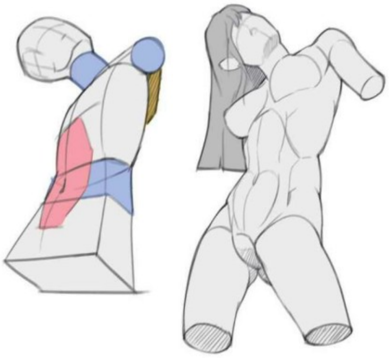
Degrees.

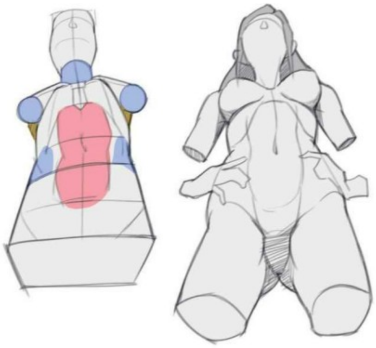
More specialized training

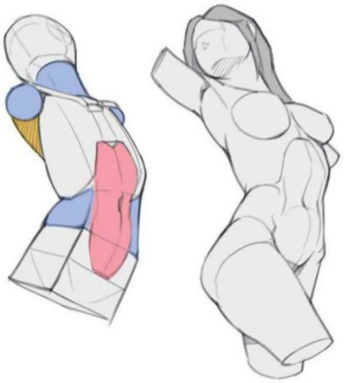
Analyze the torso blocks of figures by referring to photographs to understand the dynamic patterns of the torso. Then, practice torso representation along with the head. While practicing, try changing the proportions of the chest, pelvis, and head to depict the torso of people at different ages. You can also try drawing the torso in different poses and from different angles.

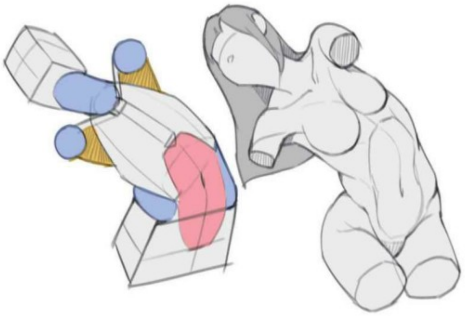


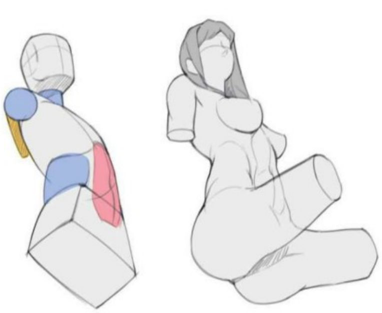


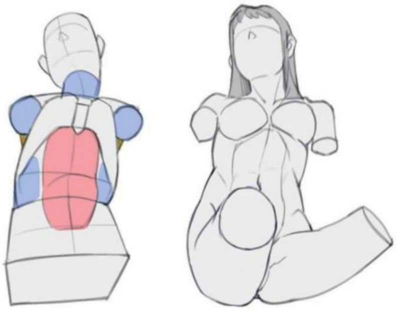


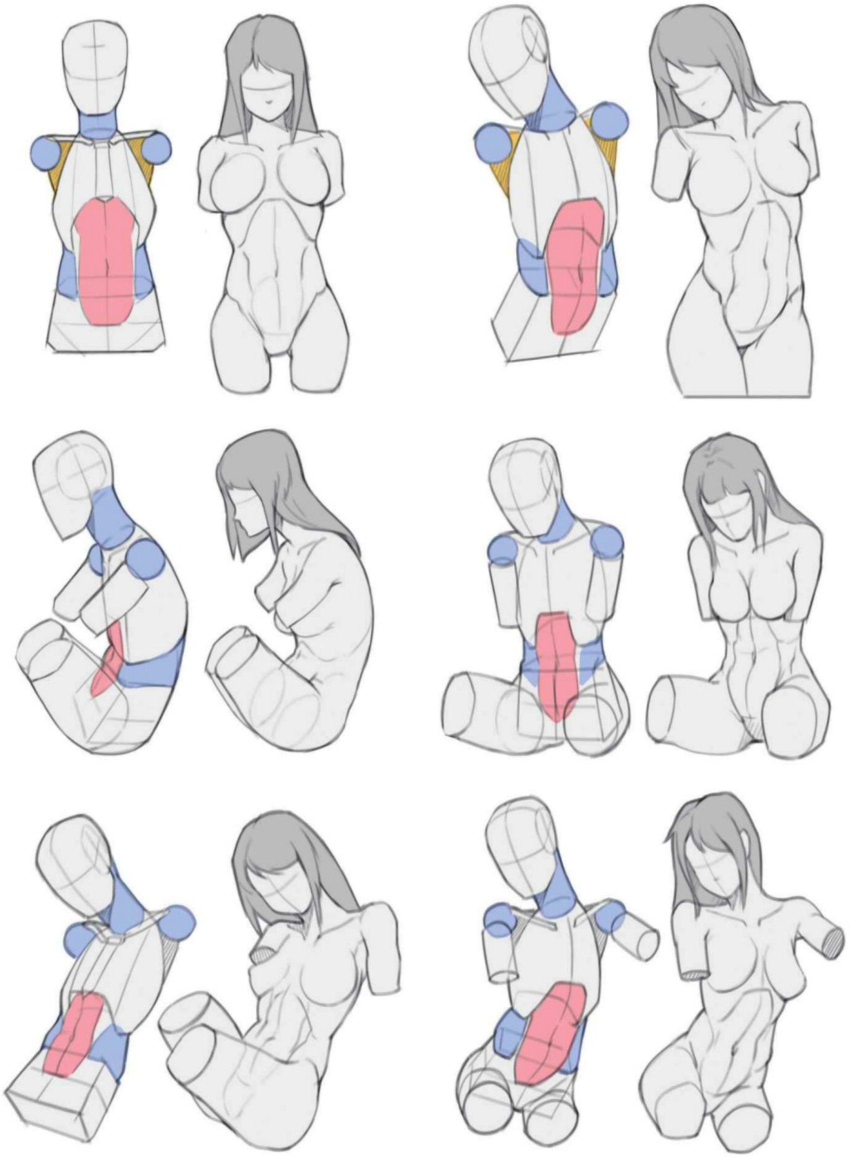


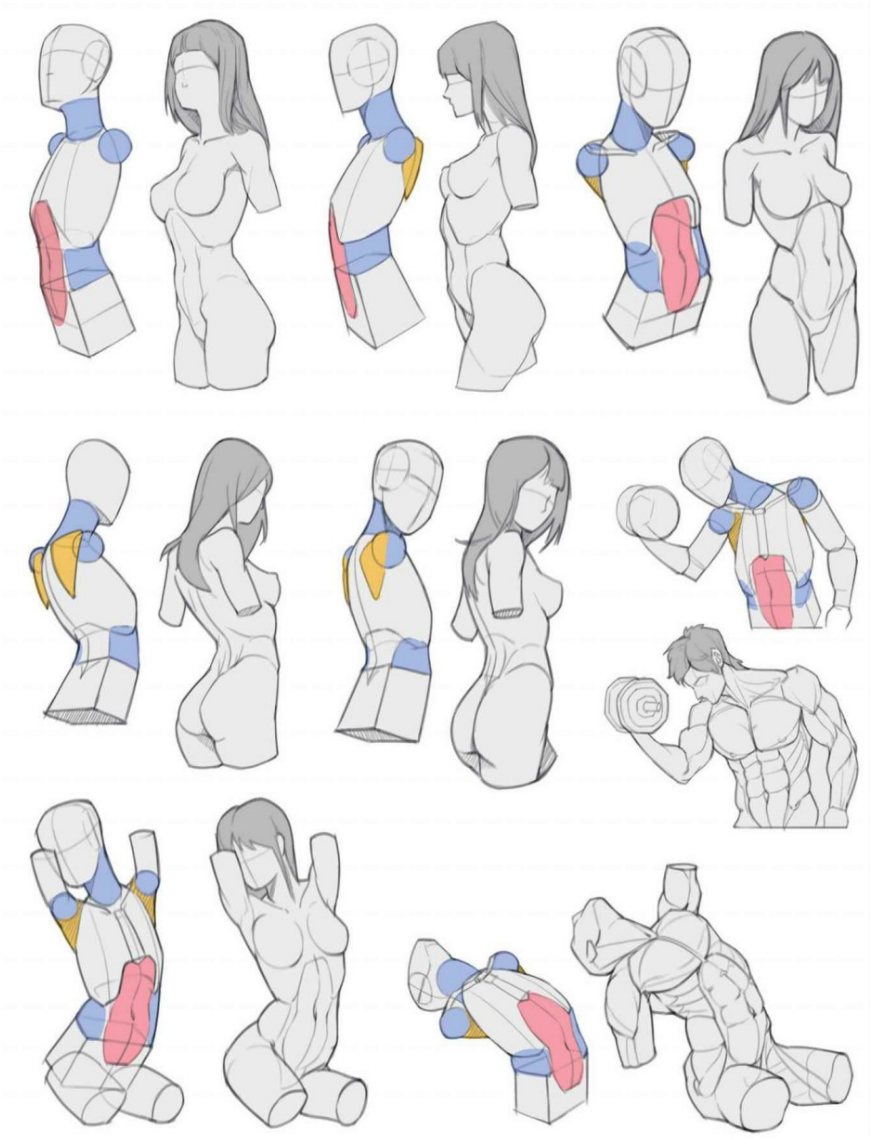


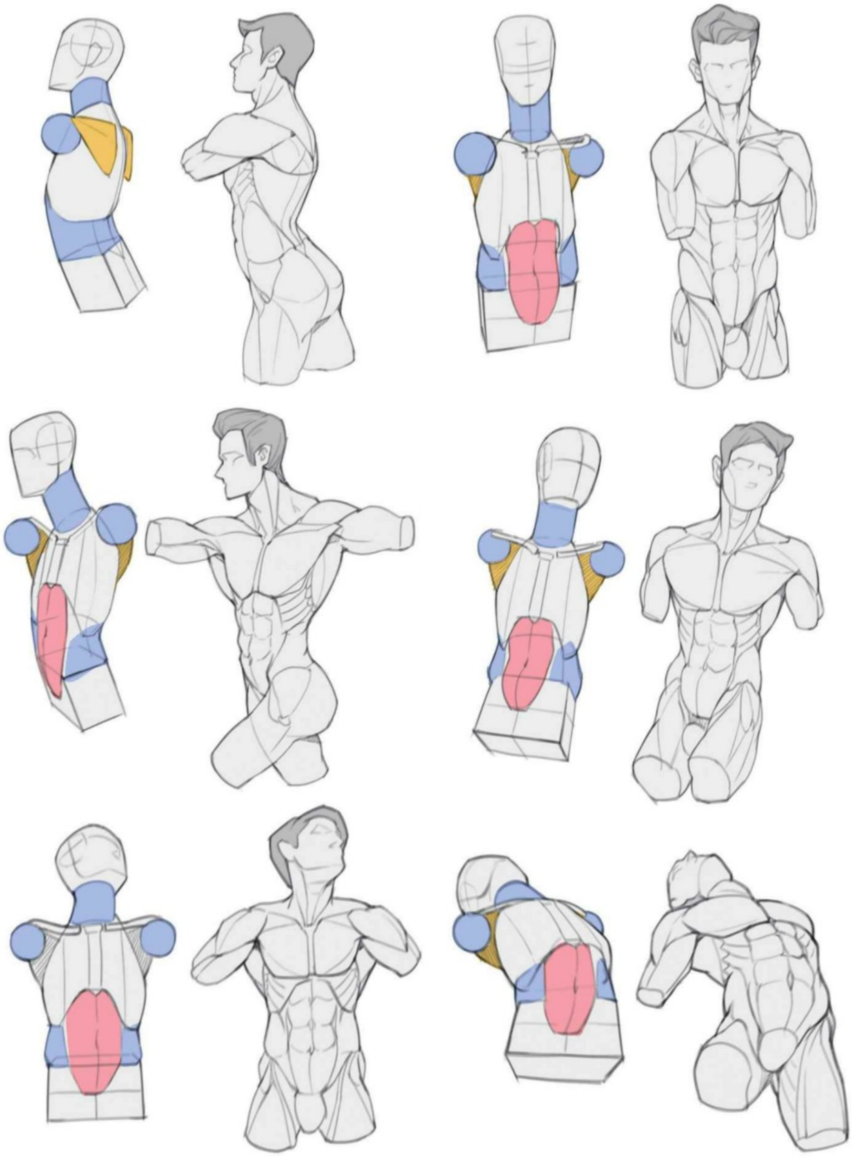


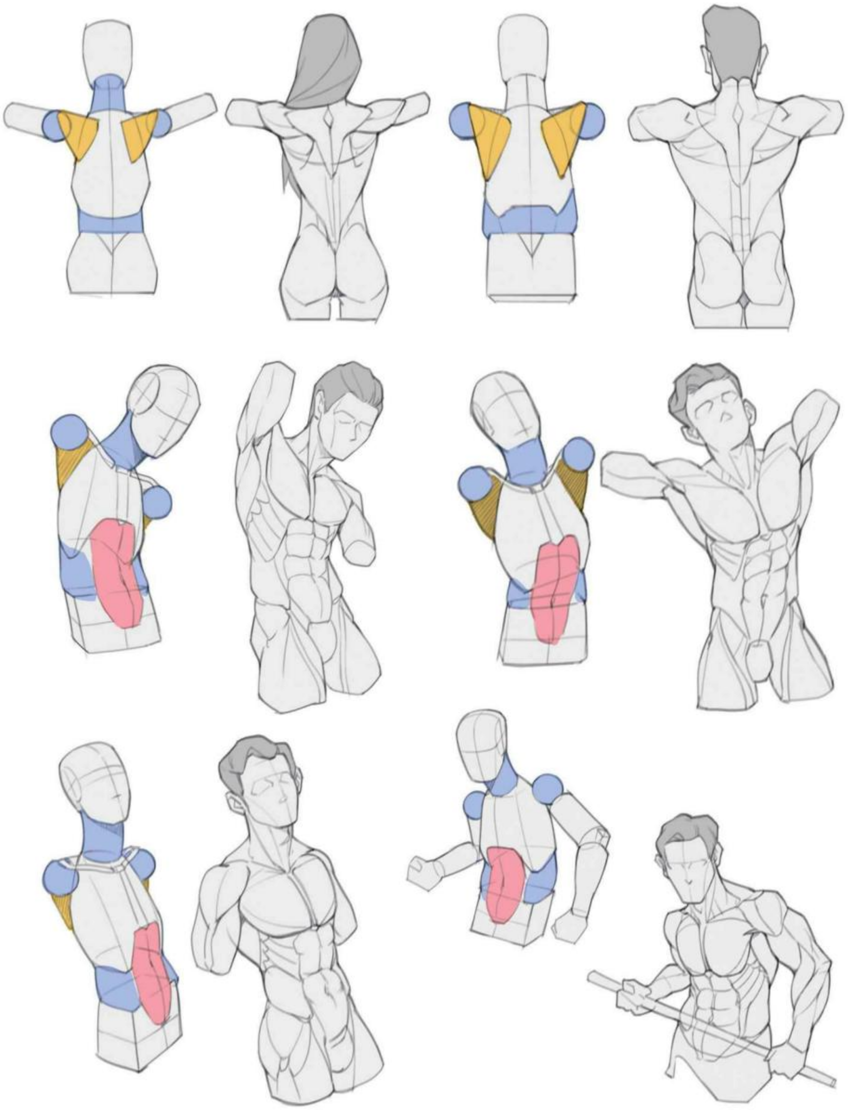




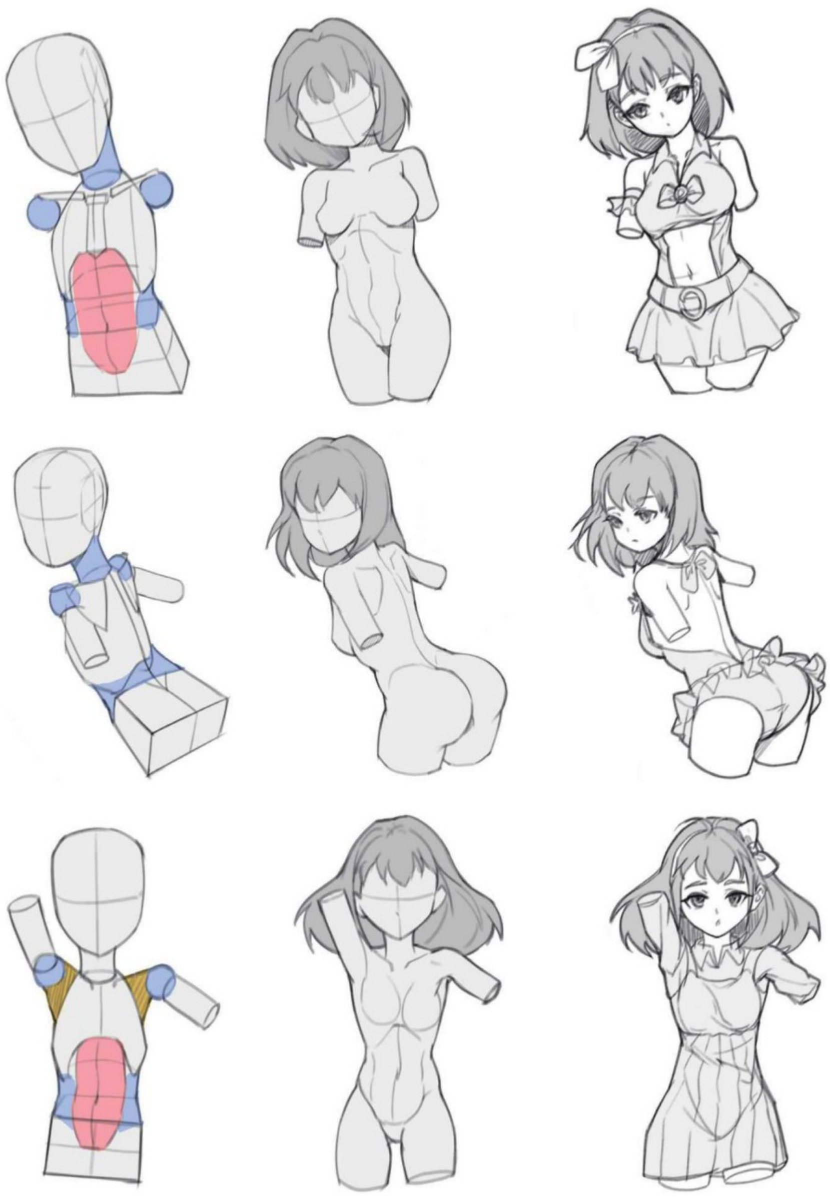


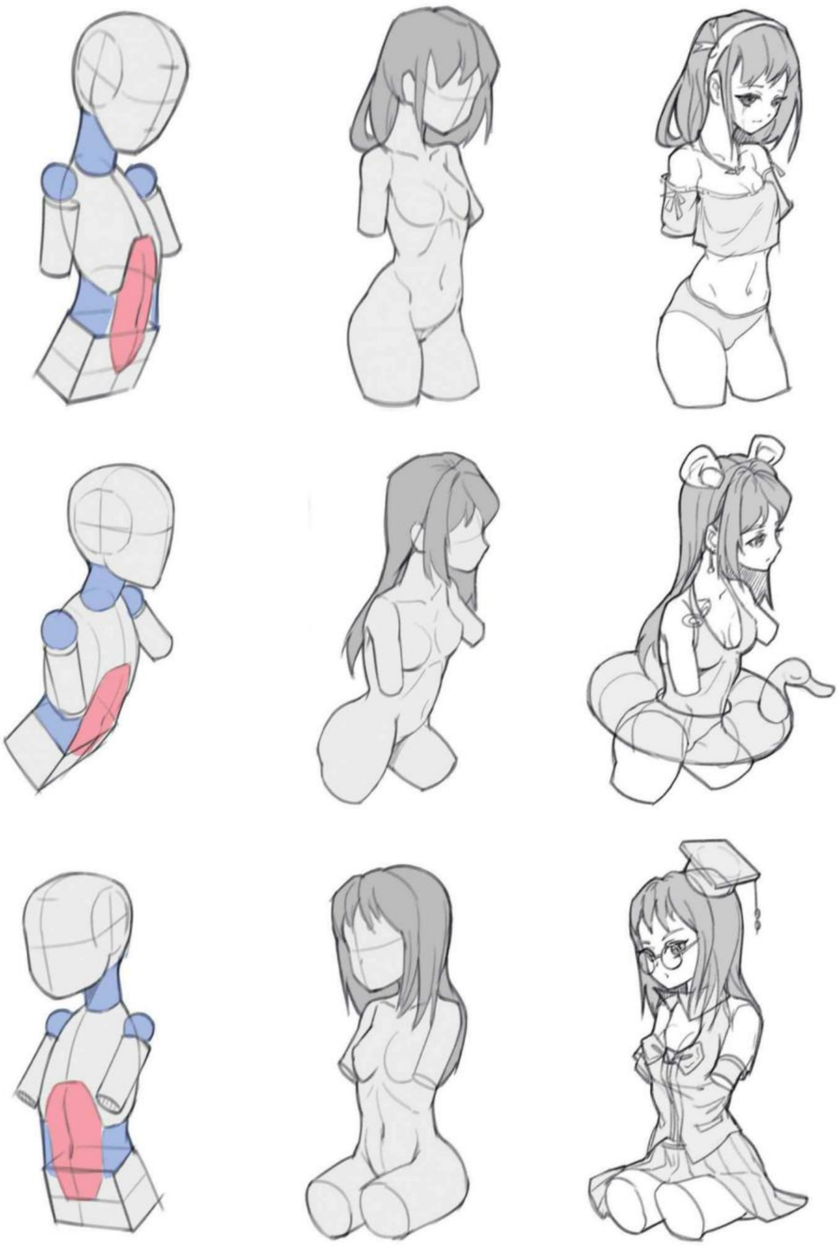




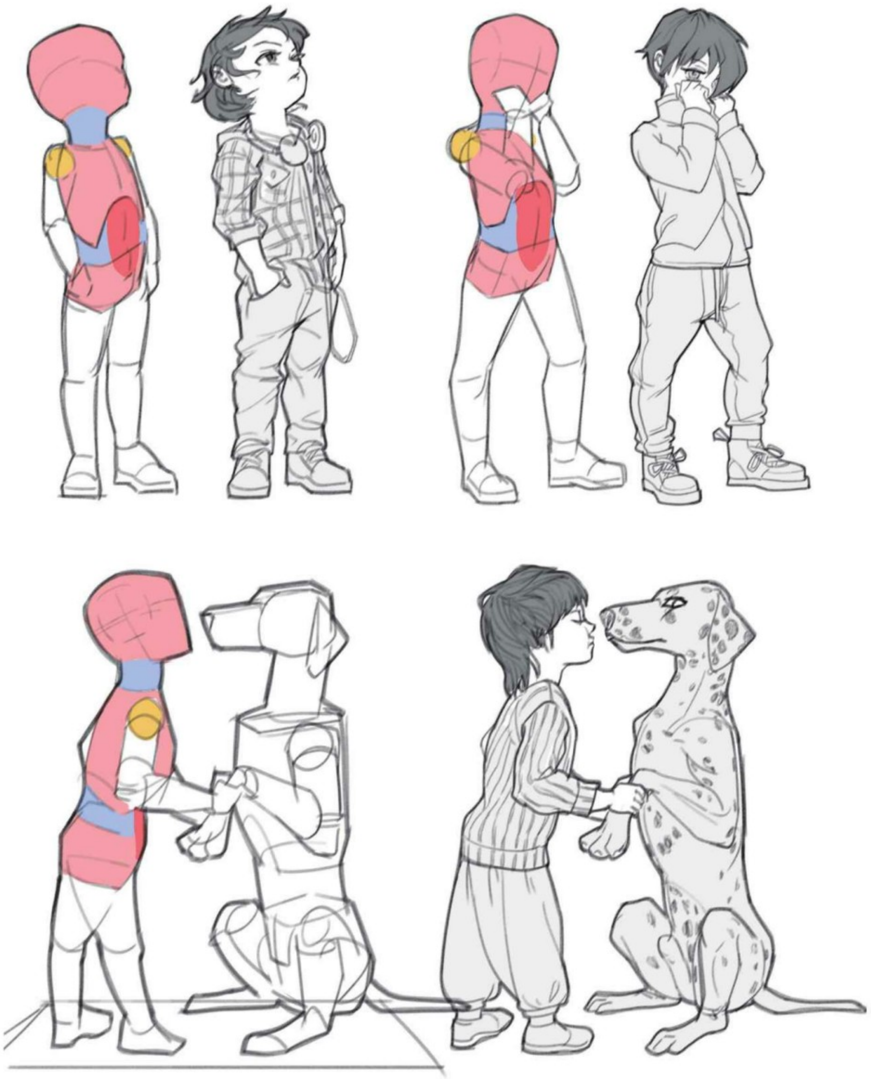


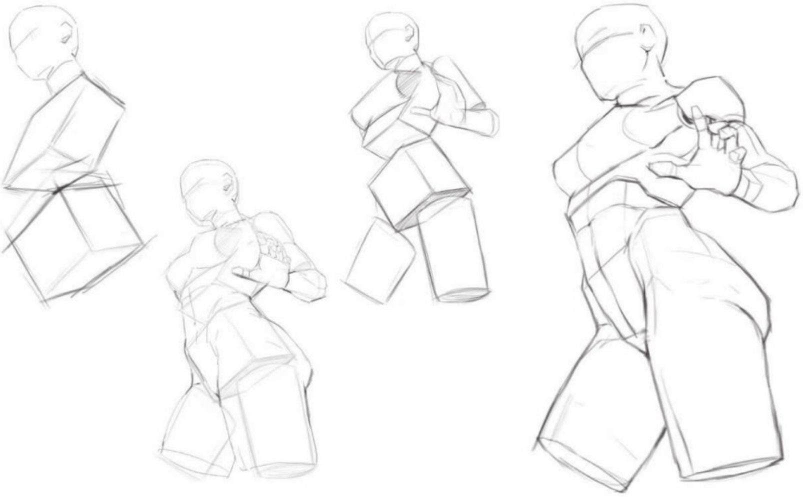
Try refining the structure on the volume blocks; this demonstrates how to draw the torso of a "loli" type girl.

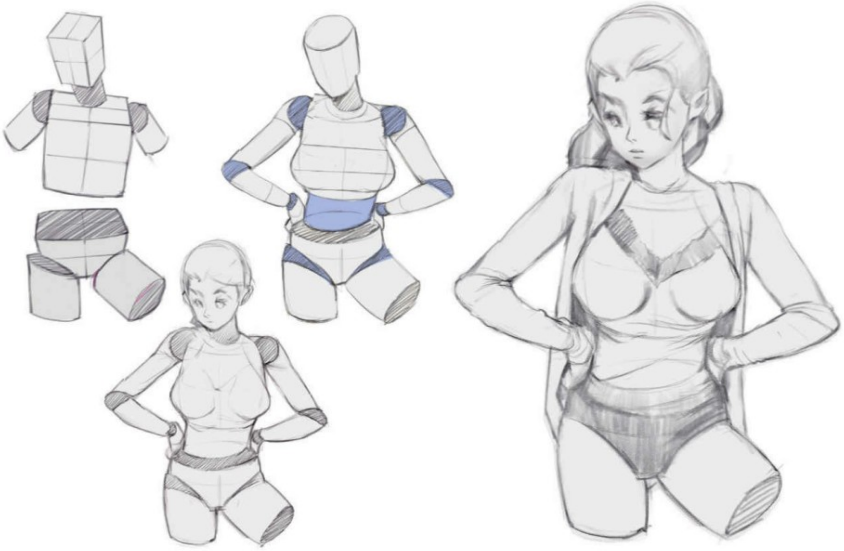


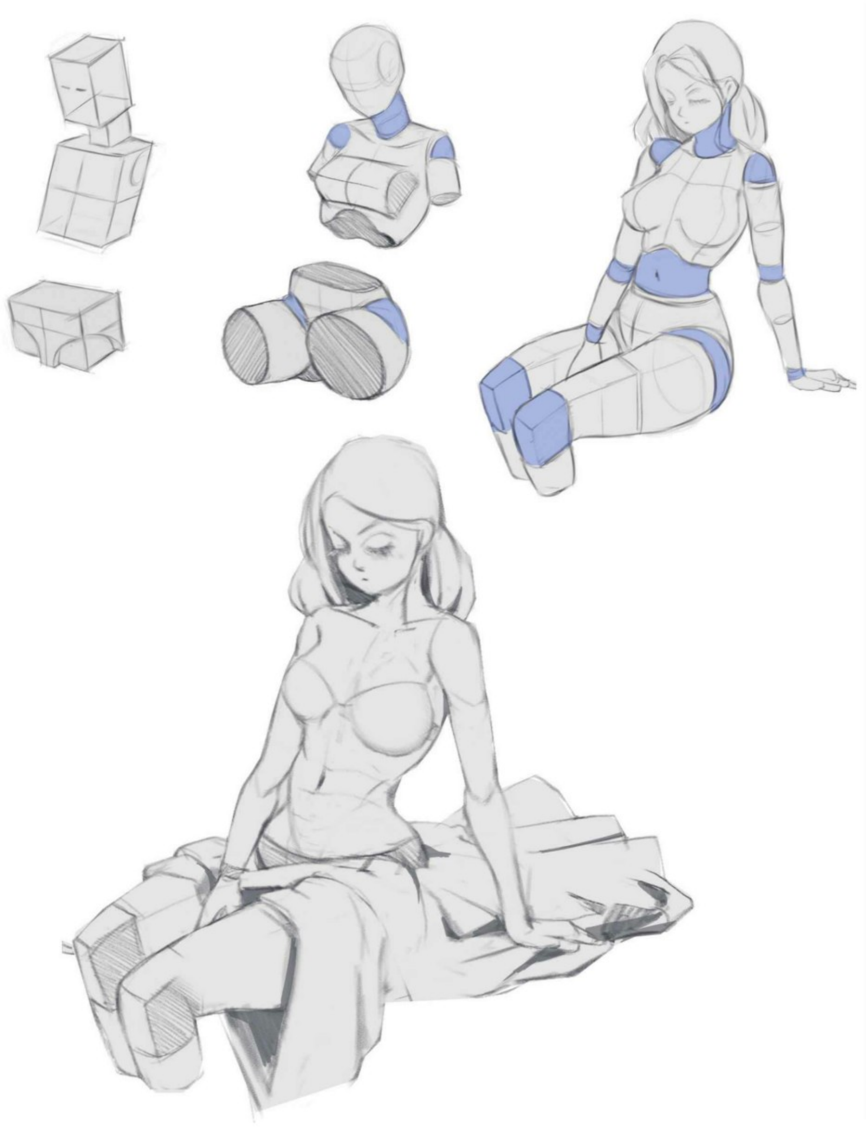


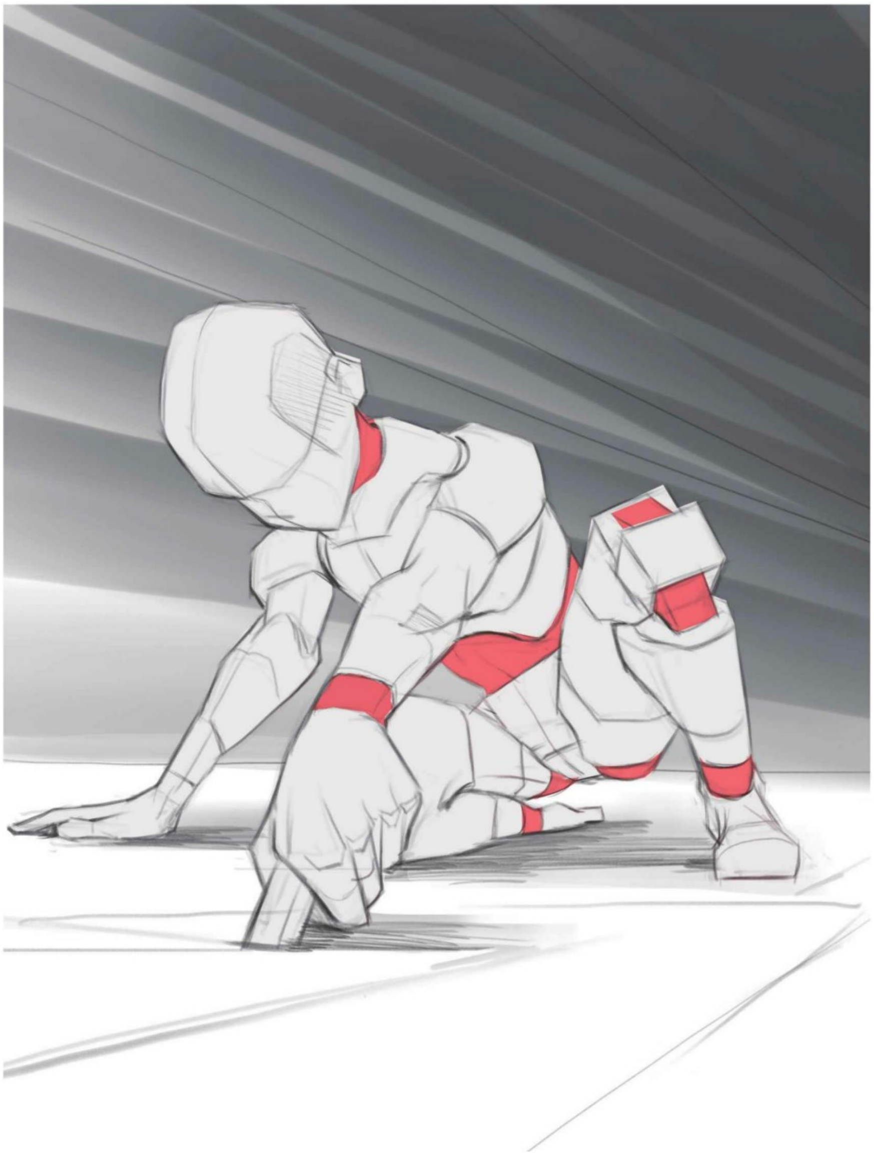
Do another set of exercises. The twisting of the torso combined with coordinated limb movements can express a more emotional character.











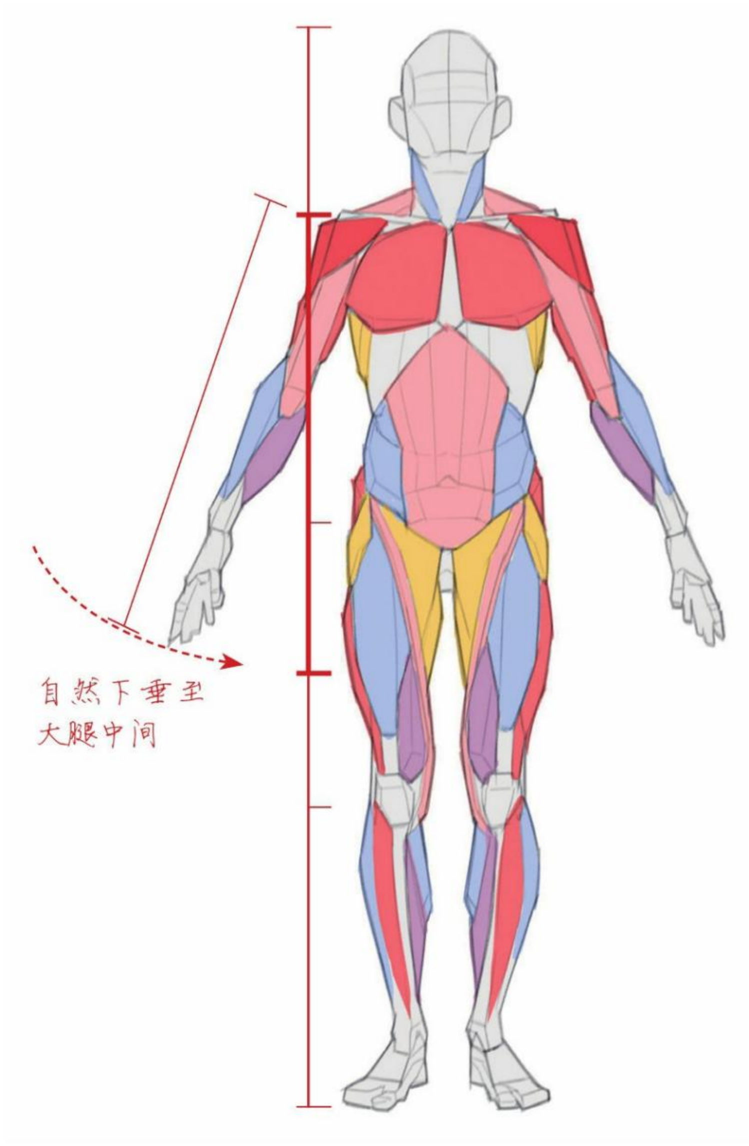
Chapter 3 Arm-Specific Training

hand The arm is one of the most difficult elements to draw; beginners often cannot understand the rules of its movement and changes, making it very difficult to draw. Correctly draw the shape of a muscle stretch. To overcome this challenge with the arms, this chapter will explain... The exercises detail the changes in arm proportions, bones, and muscles, illustrating the patterns of arm movement. When performing these exercises, it's important to be targeted, clearly define your training objectives, and maximize efficiency.

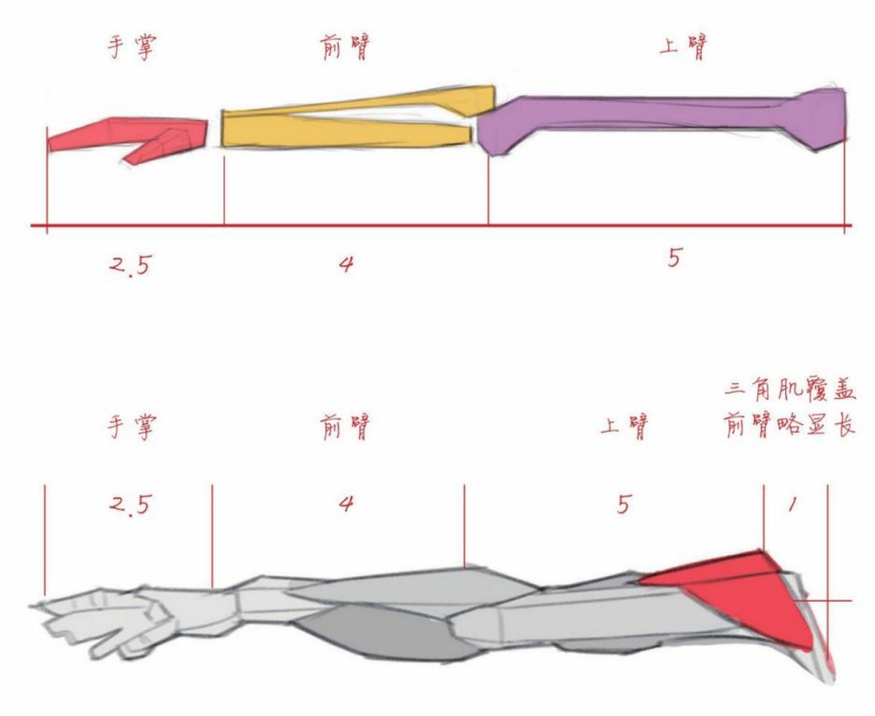
3.1 Proportional Structure of the Arm

When the arm hangs naturally, its length in the entire body extends from the shoulder to the mid-thigh.

between.

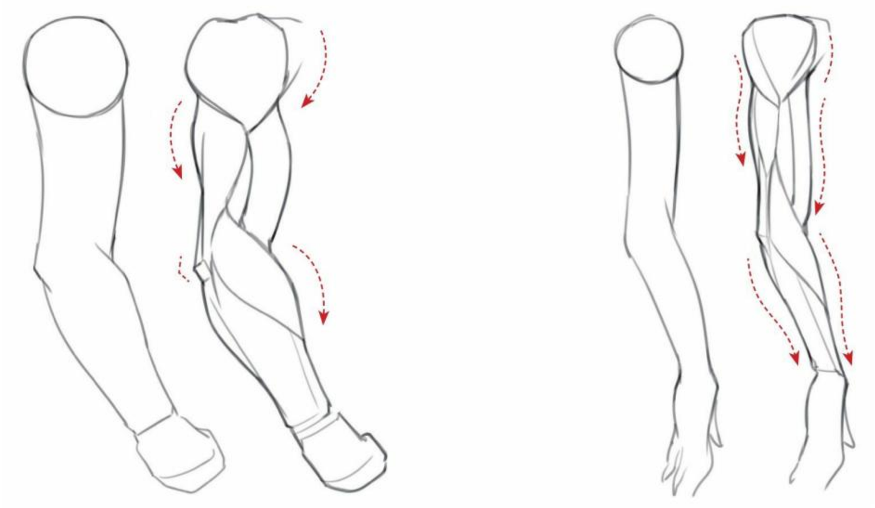


The arm can be divided into the palm, forearm, and upper arm. The forearm is slightly shorter than the upper arm, but when muscles are included, the upper arm actually appears longer when covered by the deltoid muscle. For ease of remembering, we usually think that the palm plus the forearm is approximately equal to the length of the upper arm.



Regarding the difference in arm proportions between men and women, we generally believe that men's arms are wider and thicker. Stronger, the woman's arms are more slender and smooth.

When drawing, note that the muscle outline of a man's arm is clearer, and the joints are larger; the muscle outline of a woman's arm is less obvious, the joints are smaller, and the muscles are covered by fat, so the overall structure is less detailed than that of a man's arm.



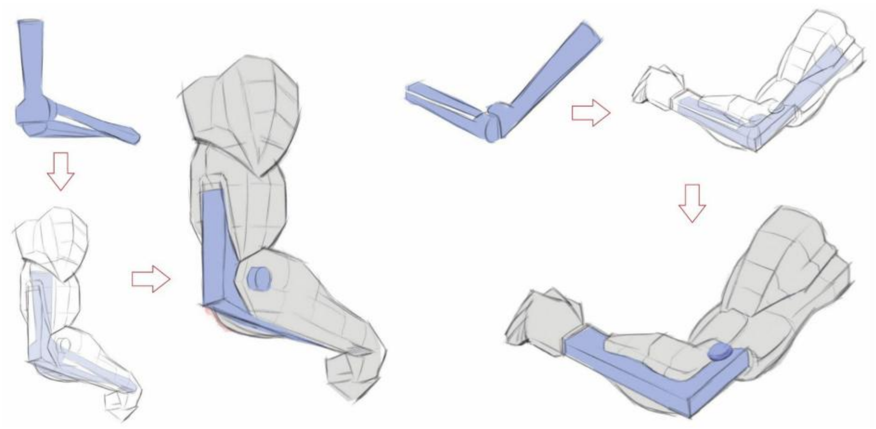
3.2 The Influence of Arm Bones and Muscles on Body Surface Appearance

As an important part of the human body, the arm is frequently depicted in drawing, so it's essential to understand its skeletal and muscular structure. Only by understanding the arm's bones and muscles can one better represent its shape and contours.

Before delving into the specific effects of bones and muscles on the body's surface appearance, let's briefly introduce the hand.

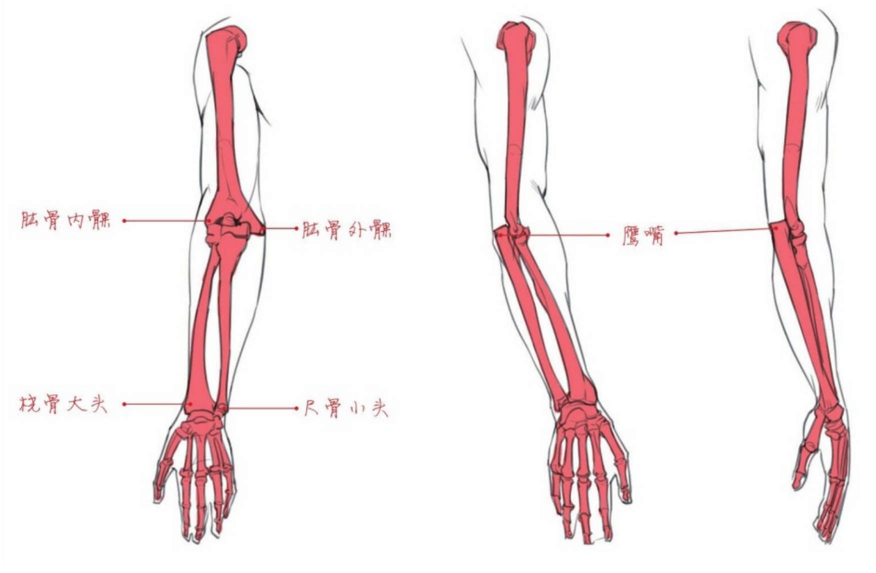
The relationship between arm bones and muscles.

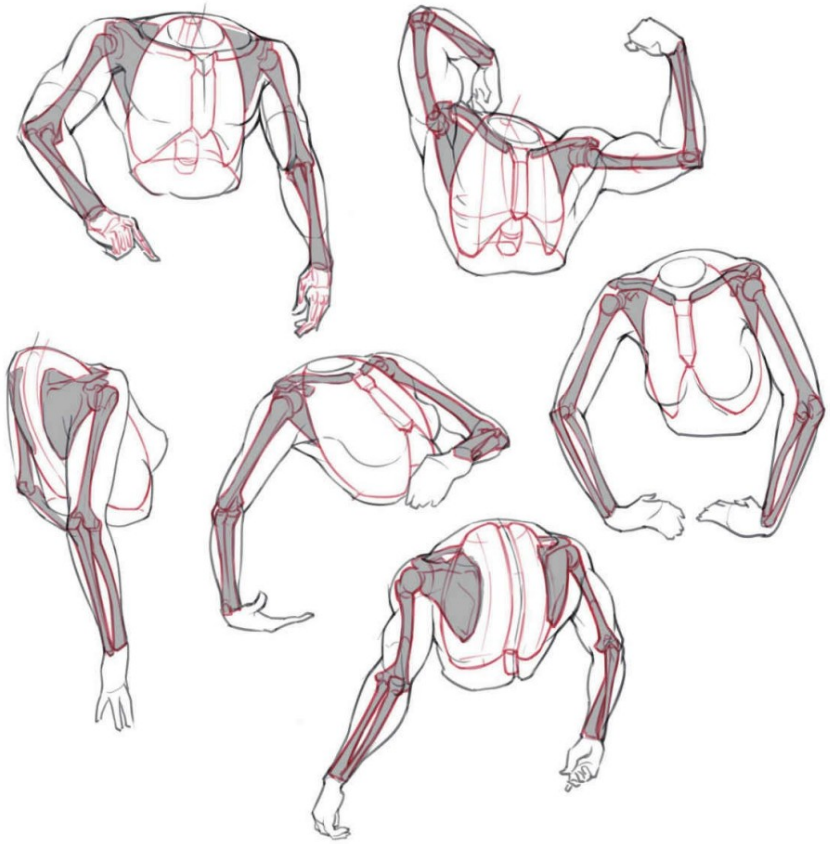
Most of the bones in the arm are encased in muscles, and their shape is only clearly visible when the elbow is bent, as shown in the picture below.

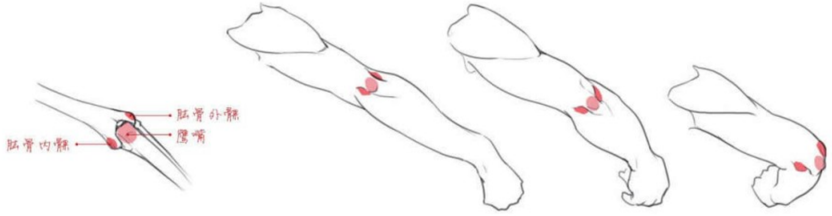


3.2.1 The Influence of Arm Bones on Body Surface Appearance

The bones of the arm provide support and influence part of the arm's appearance. Pay special attention to the bony parts that are not covered by muscles, such as the medial condyle of the humerus, the lateral condyle of the humerus, the radial head, the ulnar head, and the olecranon.


肱骨内髁
肱骨外髁
鹰嘴
桡骨大头
尺骨小头




肱骨外髁
鹰嘴
肱骨内髁

hint

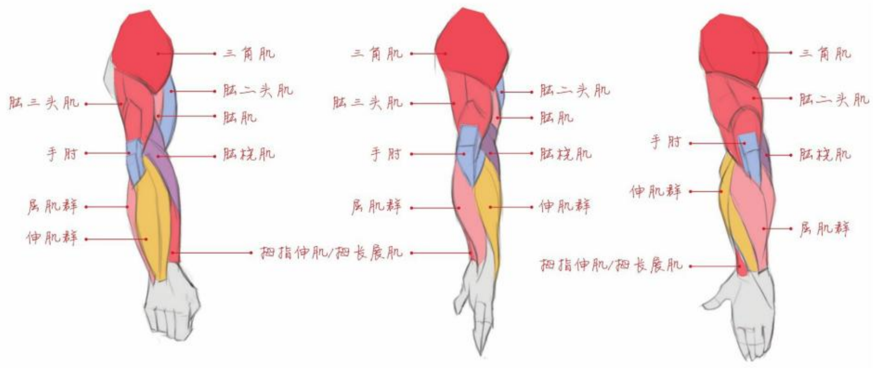
When depicting the back of the arm, the medial condyle of the humerus, the lateral condyle of the humerus, and the olecranon should be shown, especially...

These bony points become more prominent when the arm is bent.

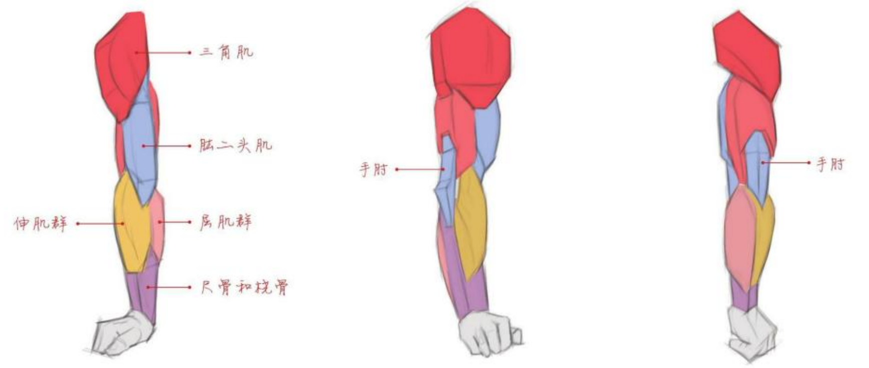
3.2.2 The Influence of Arm Muscles on Body Surface Appearance

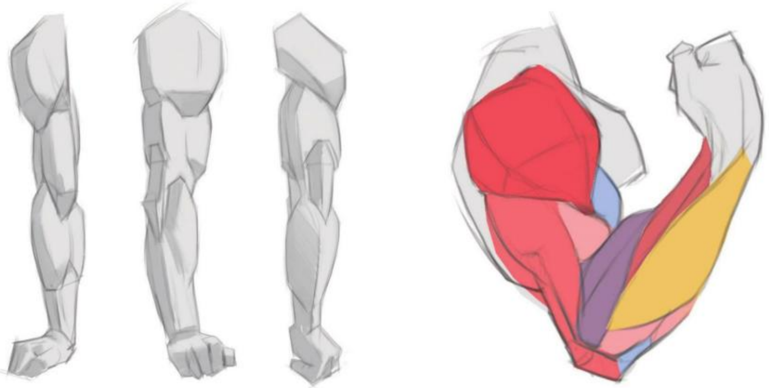
Here we simplify complex muscles into several large muscle groups to make it easier for beginners to understand.

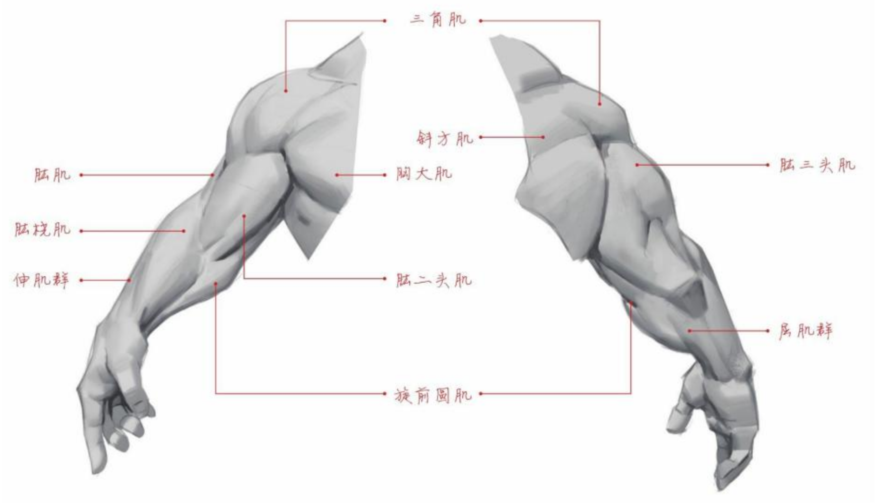
untie.


三角肌
肱三头肌
肱二头肌
肱肌
手肘
肱桡肌
屈肌群
伸肌群
拇指伸肌/拇长展肌
三角肌
肱三头肌
肱二头肌
肱肌
手肘
肱桡肌
屈肌群
伸肌群
三角肌
肱二头肌
手肘
肱桡肌
伸肌群
屈肌群
拇指伸肌/拇长展肌

Next, we will summarize these muscle groups into a simple and easy-to-remember shape.


三角肌
肱二头肌
伸肌群
屈肌群
尺骨和桡骨
手肘
手肘




三角肌
斜方肌
肱三头肌
肱肌
胸大肌
肱桡肌
伸肌群
肱二头肌
屈肌群
旋前圆肌

Having understood the basic impact of arm muscles on body appearance, we will now discuss this from three aspects.

This section will introduce the effects of the movement of various muscle groups on the shape of the arms.

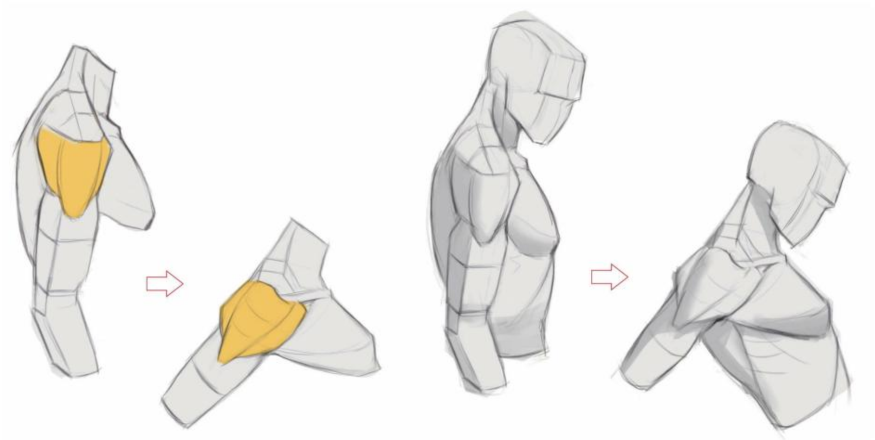
• The influence of the deltoid muscle on body surface appearance

The deltoid muscle is an important muscle in the arm. It originates from the lateral third of the clavicle, the acromion, and the scapula.

It ends at the middle or two-fifths of the lateral aspect of the humerus.

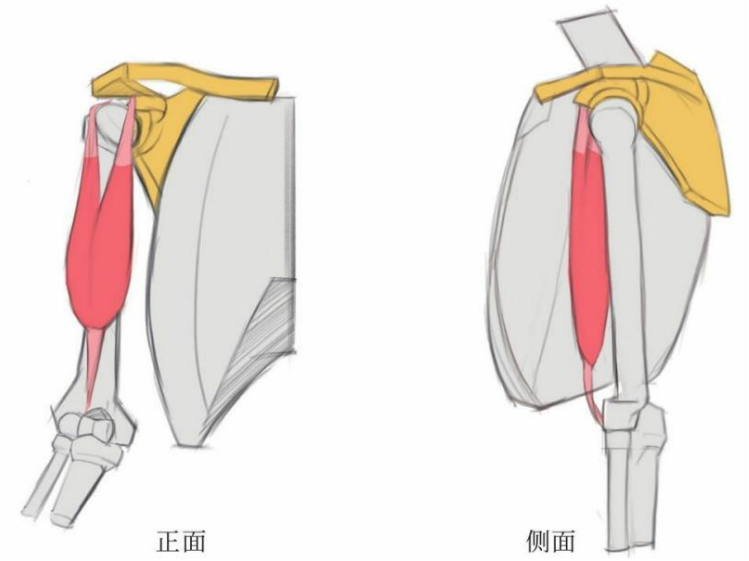
Functions: Shoulder abduction, flexion, and extension. Here, we can think of the deltoid muscle as a shoulder brace. A, precisely protecting the ends of the muscles above, provides effective protection. The deltoid muscle mainly wraps around the arm and changes with arm movement and rotation. Observing muscle dynamics, we find that when the arm is raised, the anterior and middle deltoids contract, shortening longitudinally and widening laterally; while when the posterior deltoid stretches, it lengthens longitudinally and narrows laterally.

When the arm is pulled back, the posterior deltoid contracts, while the anterior and middle deltoids stretch. The dynamic changes of the deltoid muscle are as follows.

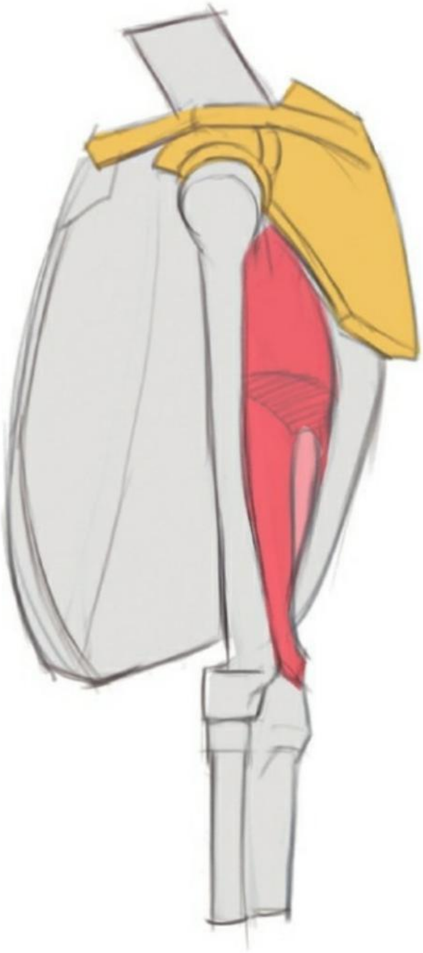


• The influence of the biceps and triceps on body surface appearance

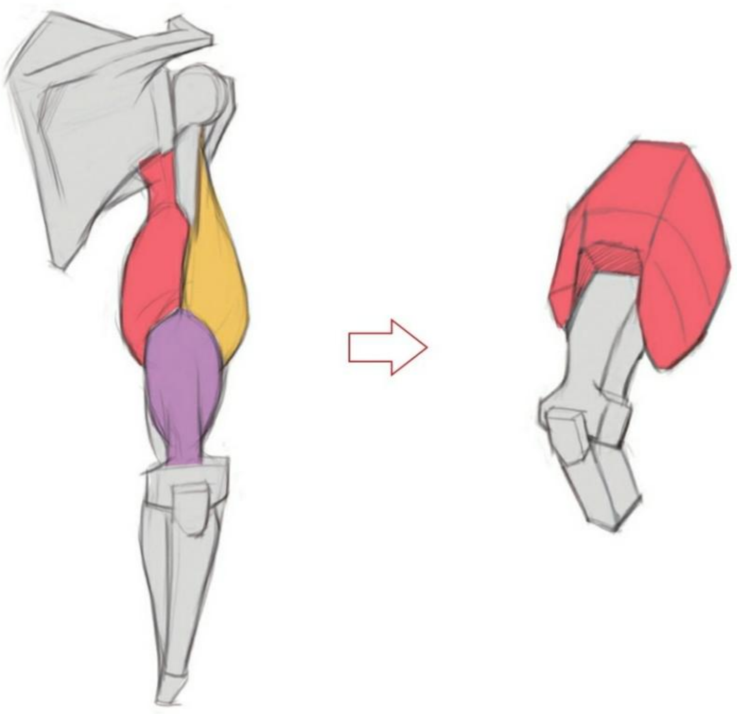
Biceps brachii: It is spindle-shaped on the front of the upper arm. It has two heads, one long and one short. The long head originates from the supraglenoid tubercle of the scapula, and the short head originates from the coracoid process of the scapula. The two muscle bundles are arranged in parallel in the middle of the humerus to form the muscle belly. They run downwards through the tendon and aponeurosis and insert into the radial tuberosity and the interosseous membrane of the forearm.



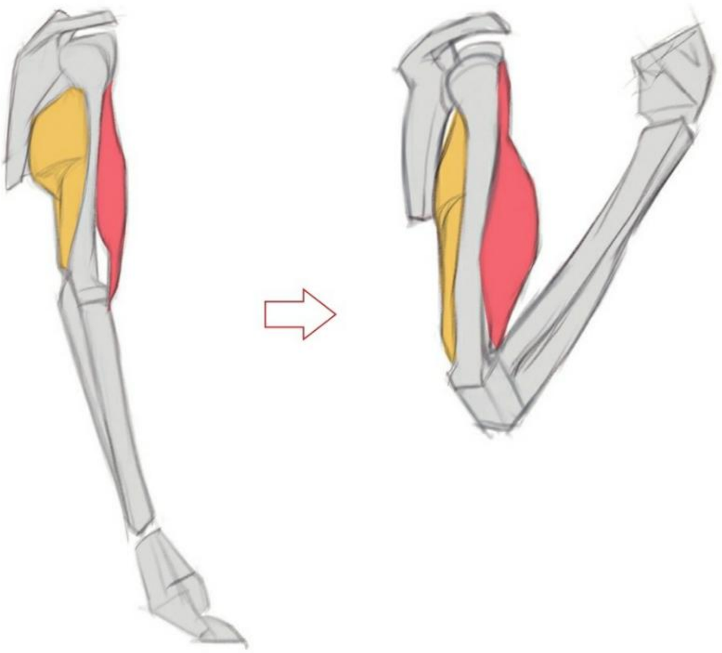
Triceps brachii: Located on the back of the upper arm, it originates from three heads: long, medial, and lateral. The long head originates from the infraglenoid tubercle of the scapula, the lateral head originates from the part of the humerus above the radial groove, and the medial head originates from the part below the radial groove. The three heads merge into one muscle belly and insert into the olecranon of the ulna via a common tendon.



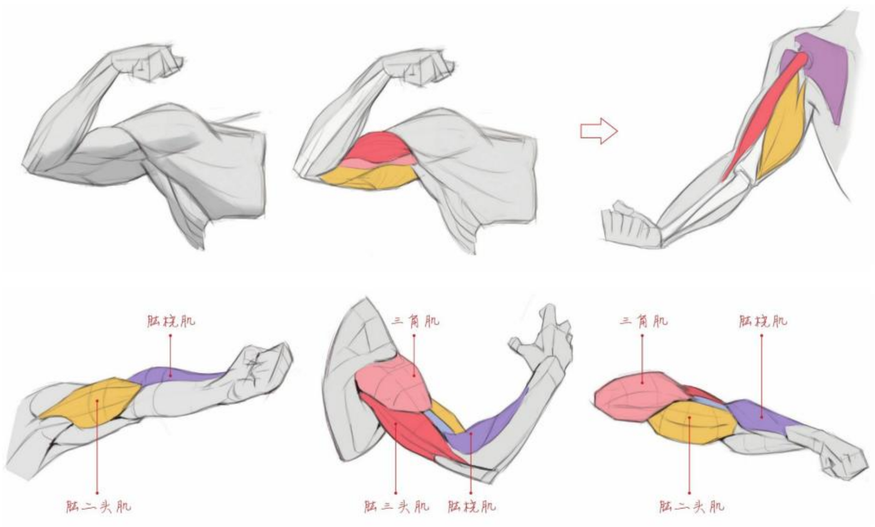
The simplified anatomical diagram of muscle structure is shown below.



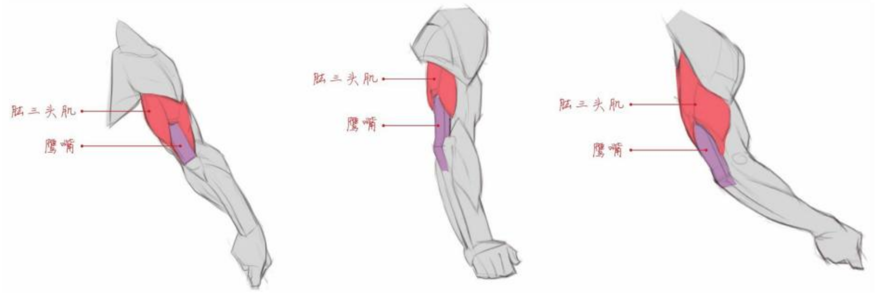
The relationship between the movement and changes of the upper arm is illustrated below.



The relationship between the movement changes of the biceps brachii and triceps brachii is illustrated below.

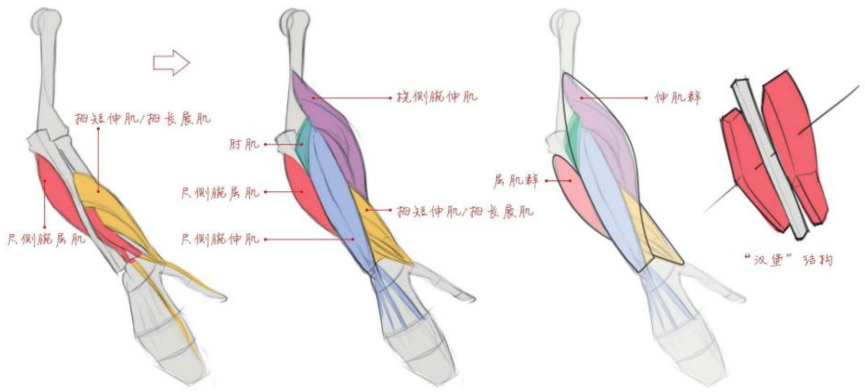

肱桡肌
肱二头肌
三角肌
肱三头肌
肱桡肌
三角肌
肱桡肌
肱二头肌

The dynamic relationship between the triceps and olecranon is as follows.

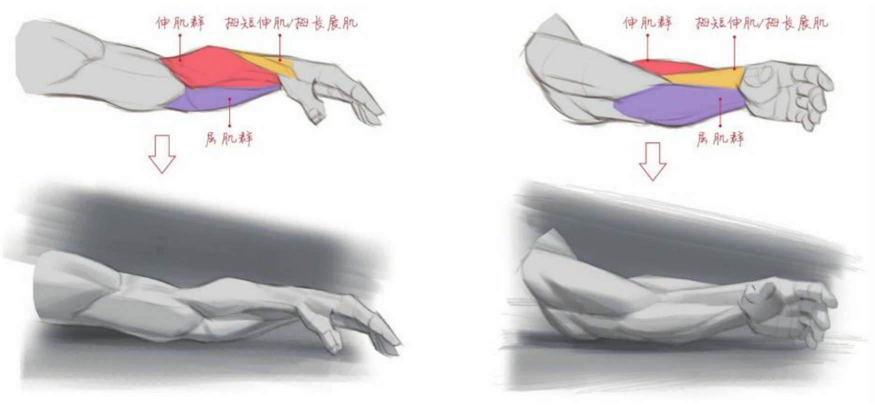

肱三头肌
鹰嘴
肱三头肌
鹰嘴
肱三头肌
鹰嘴

• The influence of forearm muscle groups on body surface appearance

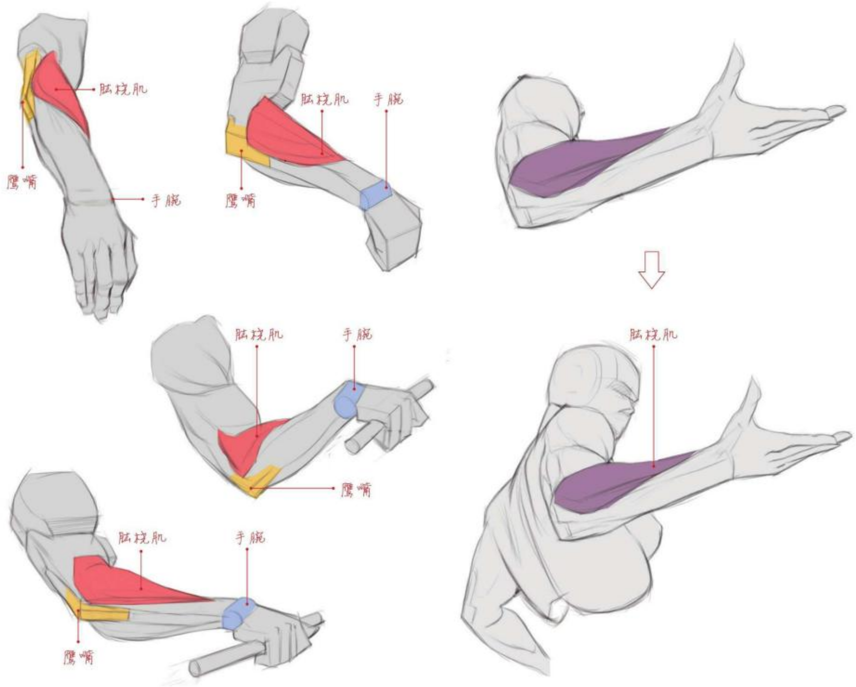
The forearm muscles are arranged in multiple layers with complex interrelationships. These muscles include the flexor carpi ulnaris, anconeus, extensor carpi ulnaris, extensor carpi radialis, extensor pollicis brevis, and abductor pollicis longus. For ease of memorization, the forearm muscles can be broadly categorized into two groups: extensors and flexors. The extensors cover the back of the hand, while the flexors cover the palm, forming a hamburger-like structure around the ulna and radius.


拇短伸肌/拇长展肌
尺侧腕屈肌
桡侧腕伸肌
肘肌
尺侧腕屈肌
拇短伸肌/拇长展肌
尺侧腕伸肌
伸肌群
屈肌群
"汉堡"结构

The morphology of the extensor and flexor muscle groups at other angles is as follows.


伸肌群
拇短伸肌/拇长展肌
屈肌群
伸肌群
拇短伸肌/拇长展肌
屈肌群

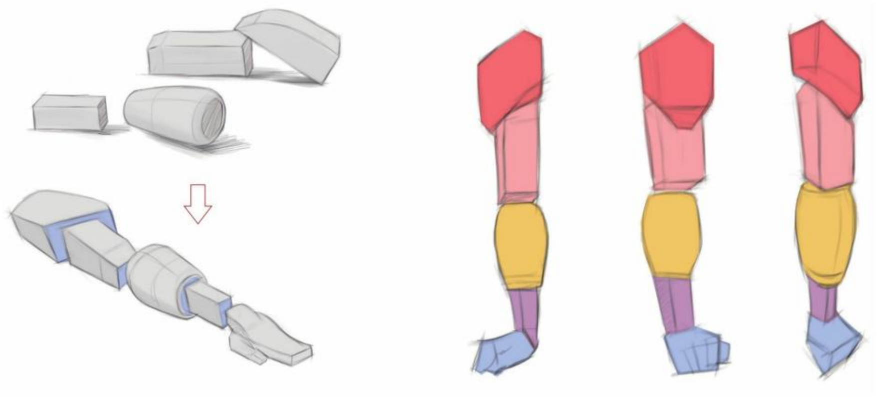
The brachioradialis muscle connects the hindarm and forearm and is very important in the representation of the arm. When drawing an arm in motion, pay attention to the origin point and shape changes of the brachioradialis muscle.


肱桡肌
鹰嘴
手腕
肱桡肌
手腕
鹰嘴
肱桡肌
手腕
鹰嘴
肱桡肌
手腕
鹰嘴
肱桡肌

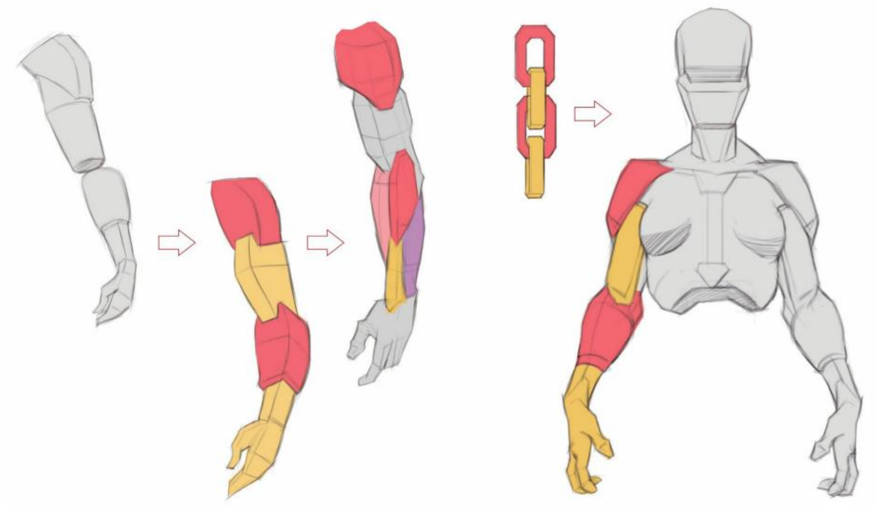
3.3 Connections between the arm, torso, and hand

The arm is an important part of the human body and a key focus when drawing the human form. However, in actual drawing practice, many beginners often only draw a simple cylinder to represent the arm structure, resulting in a stiff and unnatural arm structure, or an unnatural connection between the arm and the chest cavity. Before drawing the arm structure, we must first understand the connection between the arm and the torso and hand.

Next, we will simplify the complex arm structure into a cylinder (forearm) and two rectangles.
Body (upper arm and wrist) and polygon (deltoid region).

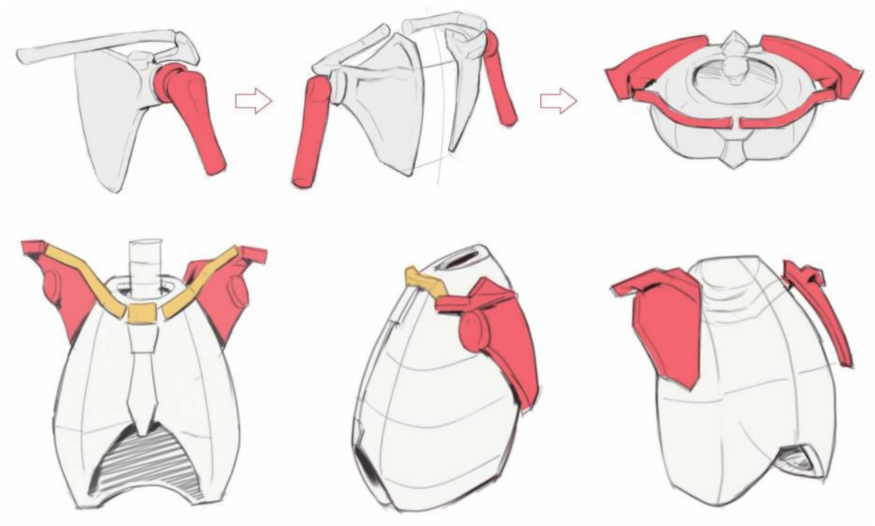


We can imagine the connection between the arm and other parts as a chain structure, as shown in the figure below.



3.3.1 Connection between the arm and the scapula and clavicle

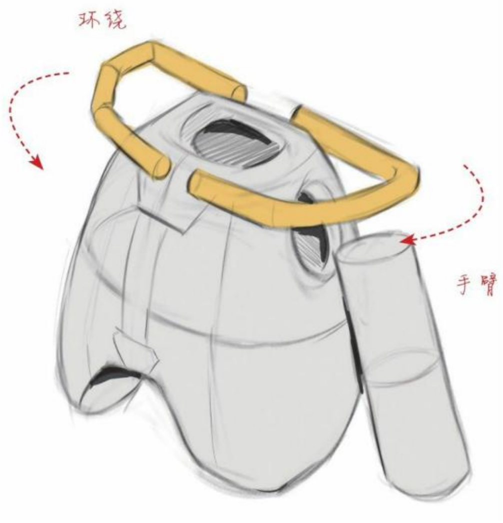
Before drawing an arm, it's essential to understand how it connects to the scapula and clavicle. The humerus grows at the junction of the scapula and clavicle and extends into the groove on the outer side of the scapula. It rotates freely in the middle.



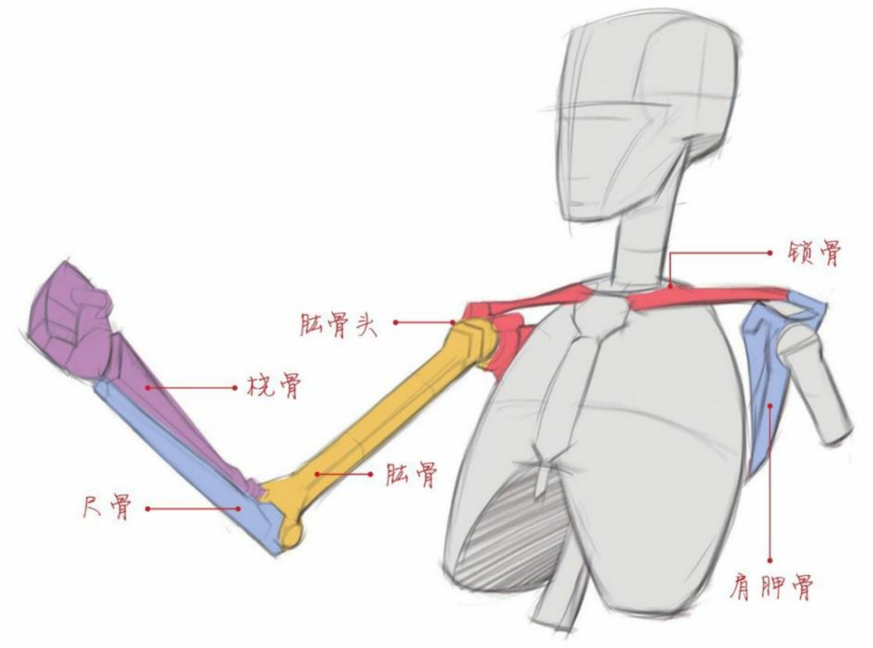
hint

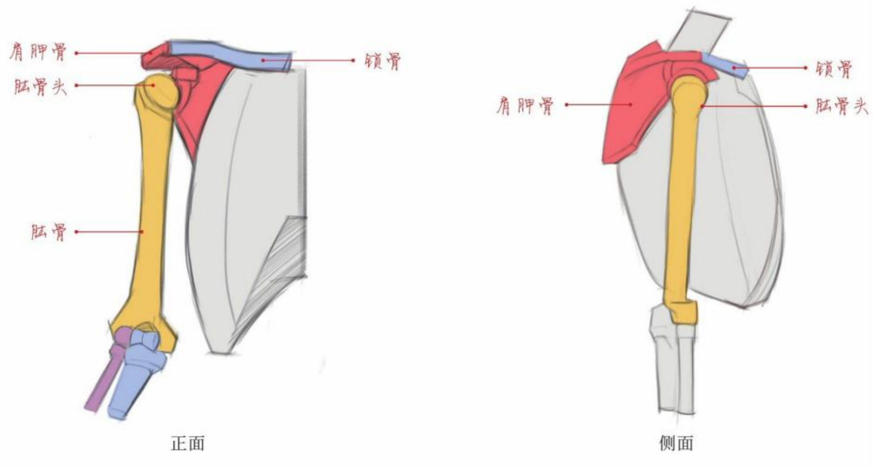
The scapula can move to a small extent; it is not fixed to the chest cavity and cannot move.

The ring formed by the clavicle and scapula is like a clamp around the chest cavity.



The anatomical diagram of the arm's skeletal structure is shown below.





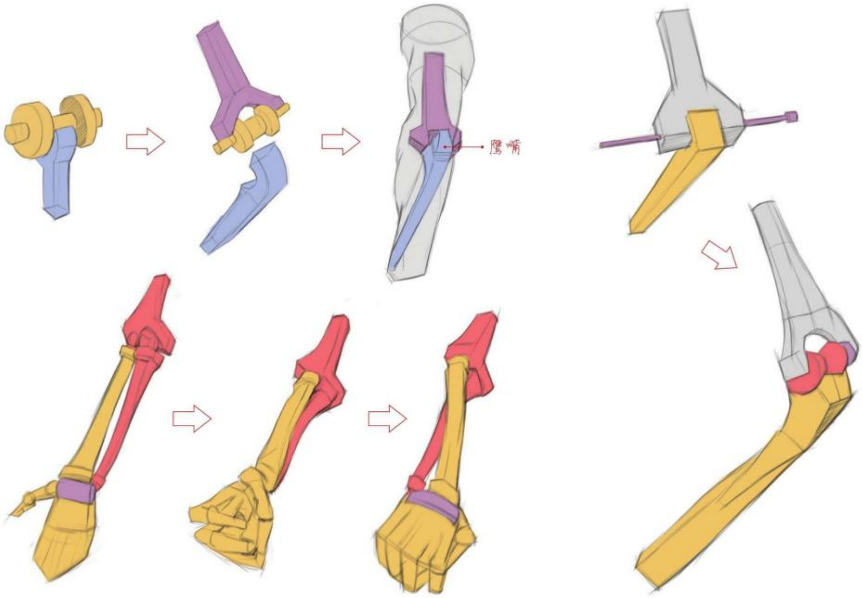
3.3.2 Forearm Connection and Movement

Before analyzing the connection and movement of the forearm, let's understand the ulna and radius. The ulna is located on the medial side of the forearm, running its entire length from the olecranon to the styloid process subcutaneously on the posterior medial aspect of the forearm. The olecranon is more prominent when the elbow is flexed; the styloid process is more prominent when the forearm is internally rotated and can be felt below the head of the ulna. This point is the ulnar styloid process point, a surface landmark for measuring hand length. Observe the back of your wrist joint.

The ulnar head at the wrist crease is very clearly visible. The radius is located on

the lateral side of the forearm; the highest point of the radial head is the radial point, a surface landmark for measuring upper arm and forearm length. In a hanging-down position with the palm facing inward, the radial point is located in a small depression on the lateral side of the elbow joint. The humeroradial joint is easily found in this depression, which also helps to identify the radial point. The lower styloid process is easily palpable subcutaneously on the lateral side, becoming more apparent when the wrist is flexed. This point is the radial styloid process point, a surface landmark for measuring forearm and hand length.

The structural changes of the ulna and radius during torsional movements are shown in the figure below.



3.4 Arm Twist and Dynamic Performance

After understanding the skeletal and muscular structure of the arm, we also need to study its different torsional states.

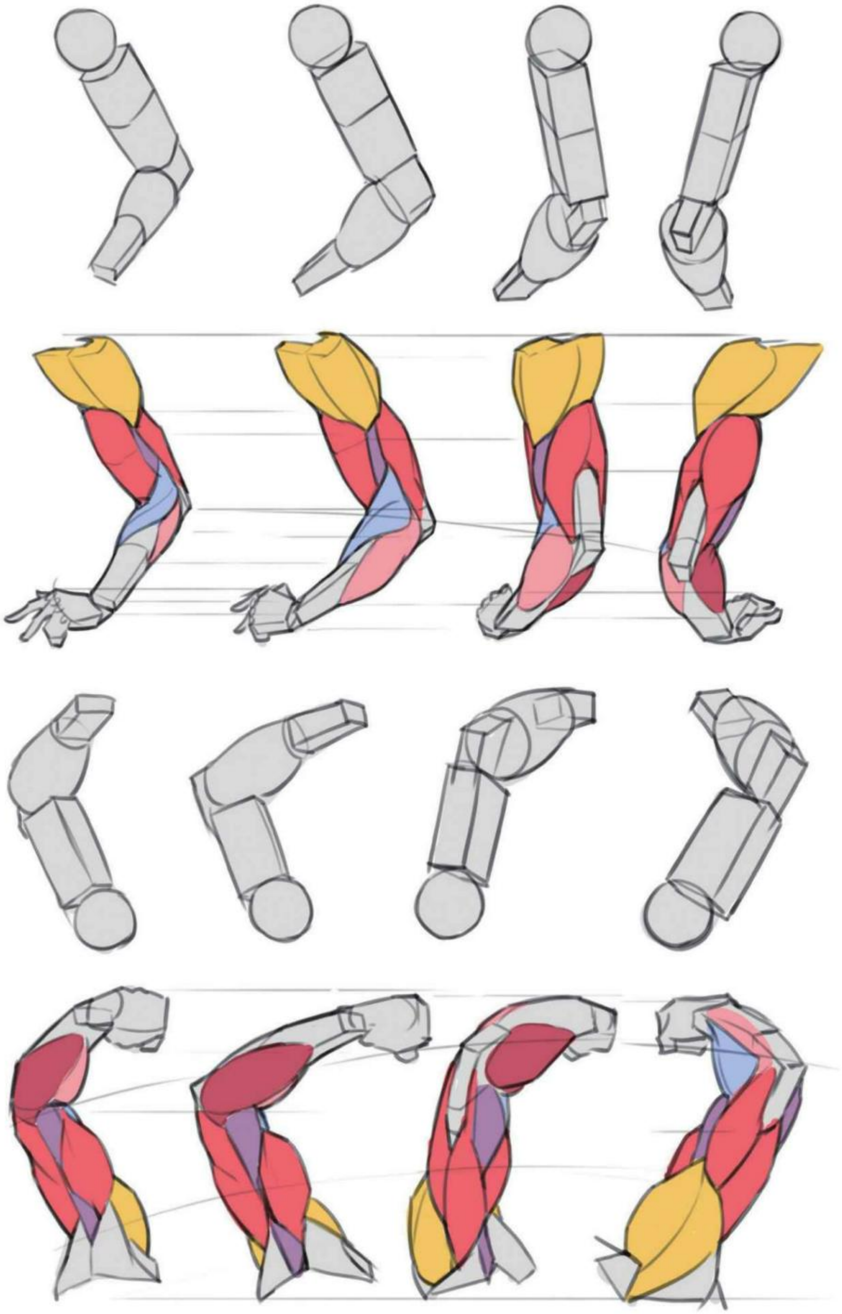
We will conduct some research on the structure and stretching changes of arm muscles.

3.4.1 Basic Arm Twist

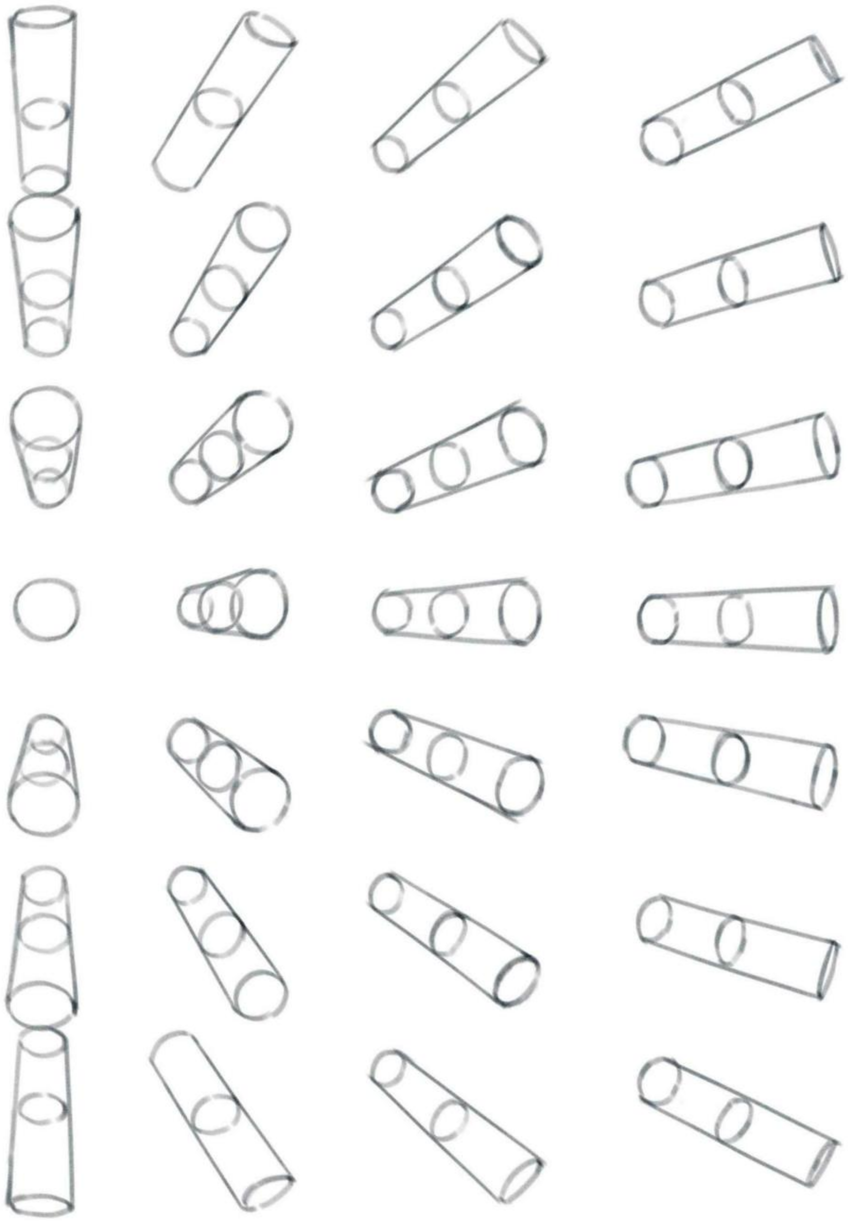
You can think of the arm as a cylinder, and grasp the proportions and perspective changes of the cylinder.

By adding the arm structure to the drawing, you can recreate the arm's shape from various angles. First, sketch

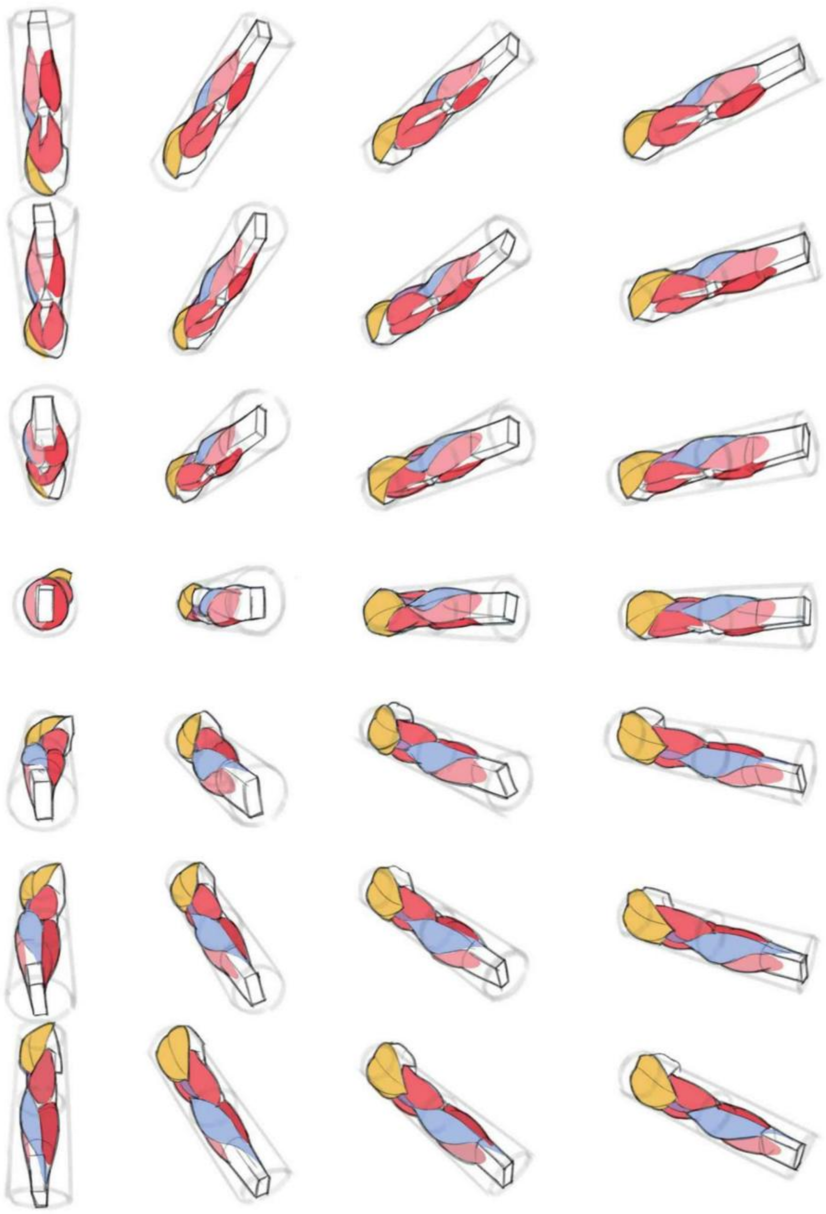
the general geometric structure of the arm, then add muscle blocks.



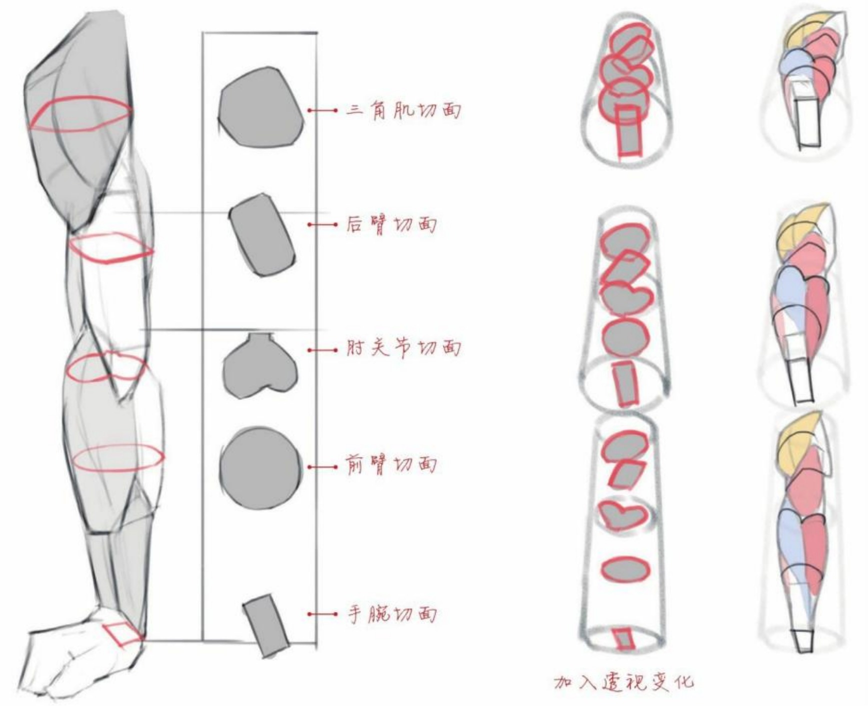
Based on the perspective rules of a cylinder, we can deduce the perspective shapes of the arms from different angles as shown below.

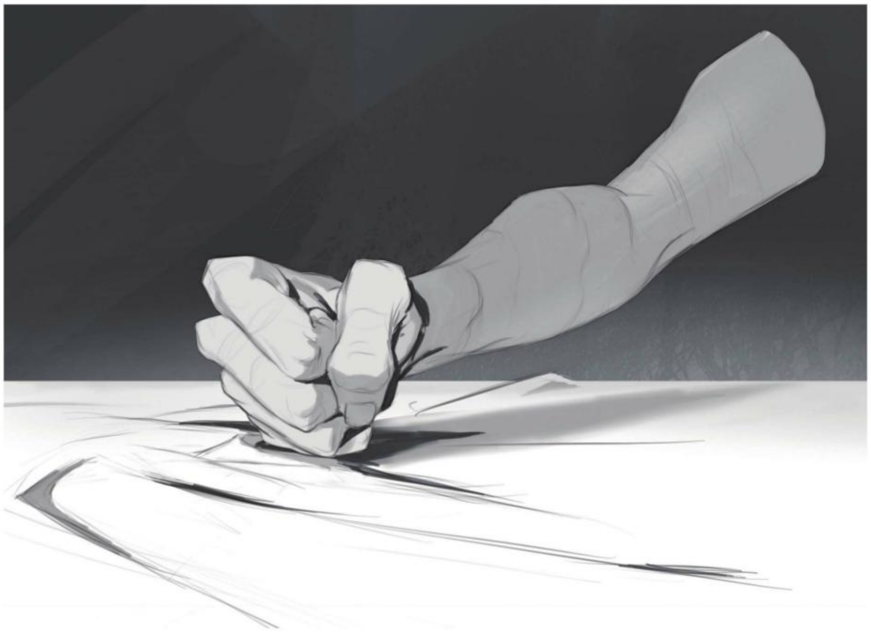


Once you've mastered the above points, you'll be able to easily draw an arm from any angle.



When adding muscles to a cylindrical perspective, pay attention to the occlusion relationship between muscle blocks. You can determine the occlusion relationship of different muscle blocks by memorizing the spatial position relationship of key sections.



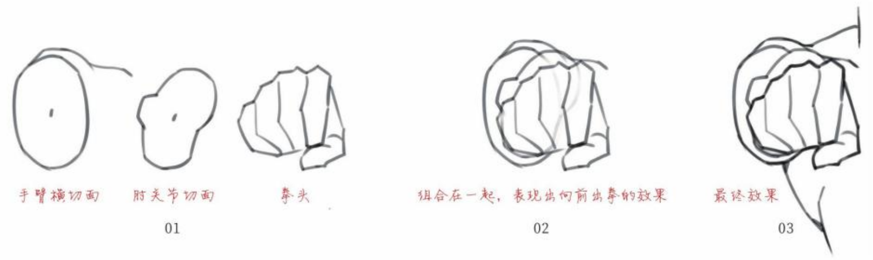


Furthermore, once we are proficient in the methods described above, we only need to draw the key cross-sections. We can now deduce the perspective structure of the arm. Below is a demonstration of how to draw an arm throwing a punch forward.

01 Draw the cross-section of the arm, the cross-section of the elbow joint, and a fist.

02 Arrange the two cross-sections and the fist in a front-to-back manner, specifically by having the closer one block the farther one.

03. Erase the parts that are not visible after being covered.


手臂横切面
肘关节切面
拳头
01
组合在一起，表现出向前出拳的效果
02
最终效果
03

3.4.2 Dynamic performance of the arm

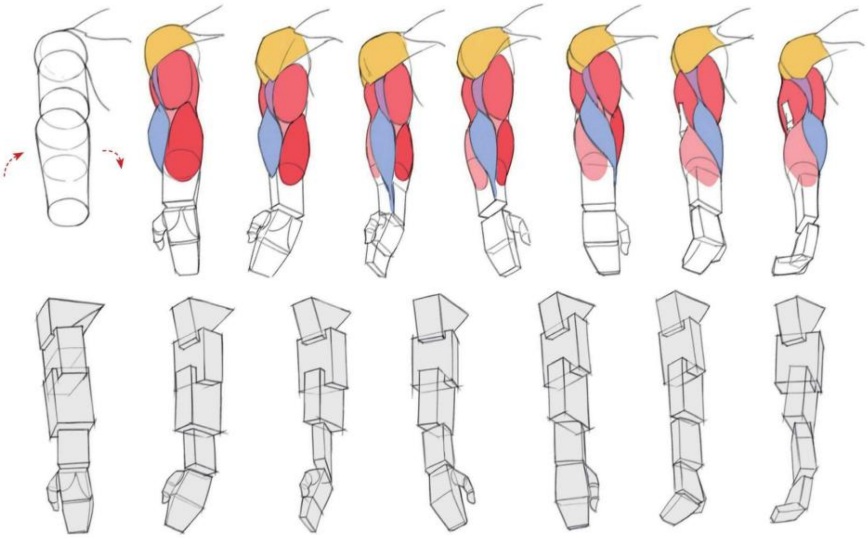
The dynamics of the arm mainly include wrist rotation, elbow flexion, and arm rotation. During arm movements, the muscles will stretch and deform.

• Wrist rotation

Wrist rotation affects the shape of muscle stretch; generally, the upper arm muscles don't change much, but...

The forearm muscles stretch and change as the wrist rotates. Below is an

example of clockwise wrist rotation.

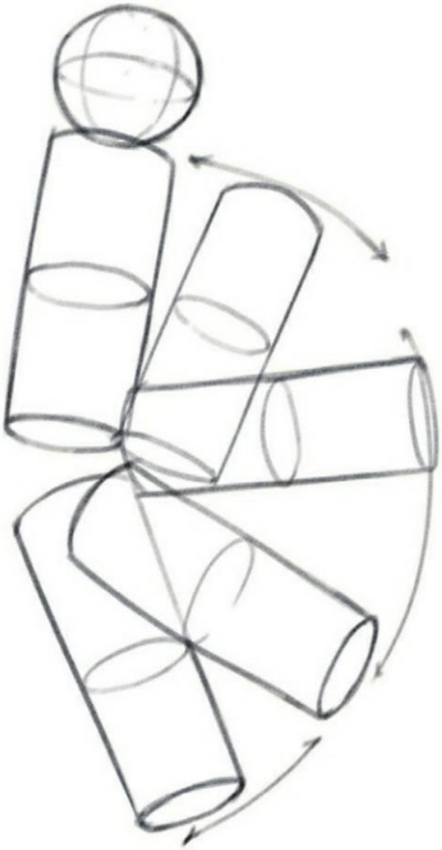


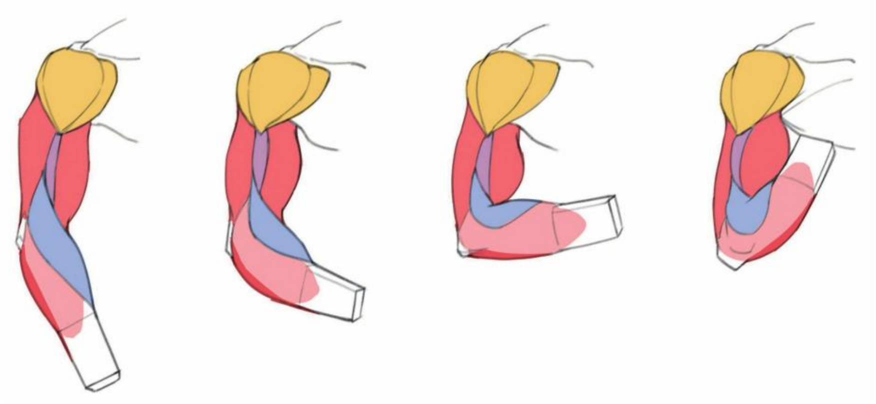
hint

When drawing, pay attention to the changes that occur when the arm muscles connect to the wrist during rotation.

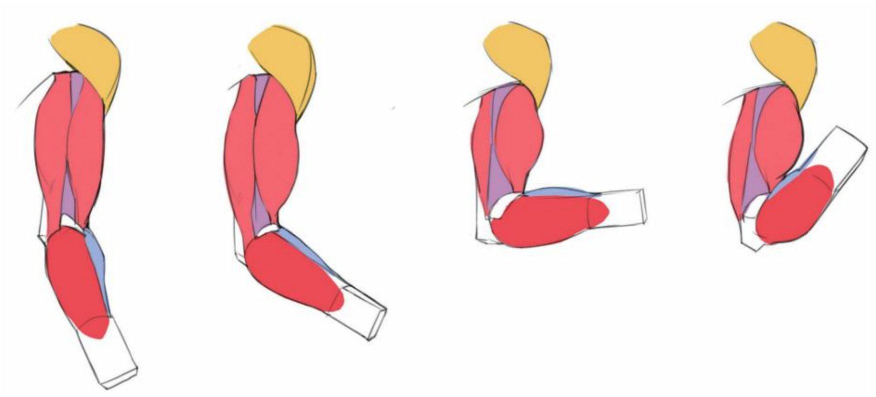
• Elbow flexion

When the elbow bends, the forearm and wrist rise along an arc. Due to muscle compression, the wrist doesn't touch the upper arm. Pay attention to the contraction and changes in the biceps and triceps when drawing.





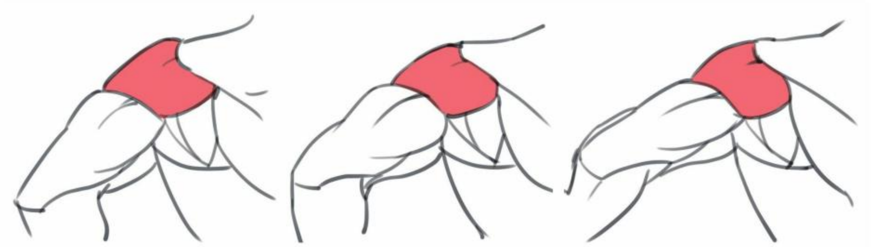
Elbow flexion lateral demonstration



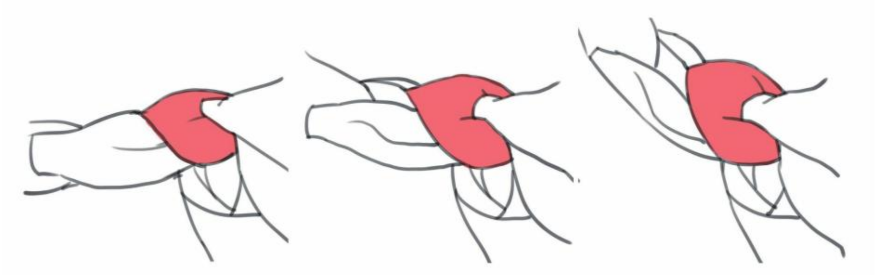
elbow flexion inner side demonstration

- Lifting and rotating the arm

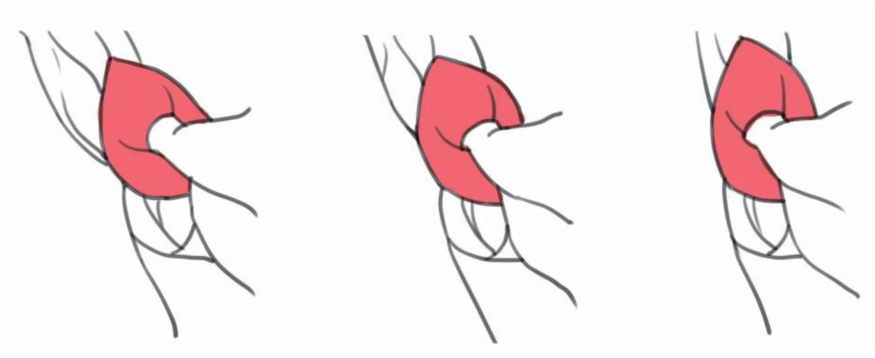
As you raise your arm, the position of your deltoid muscles changes, shifting from the side to the back.



side



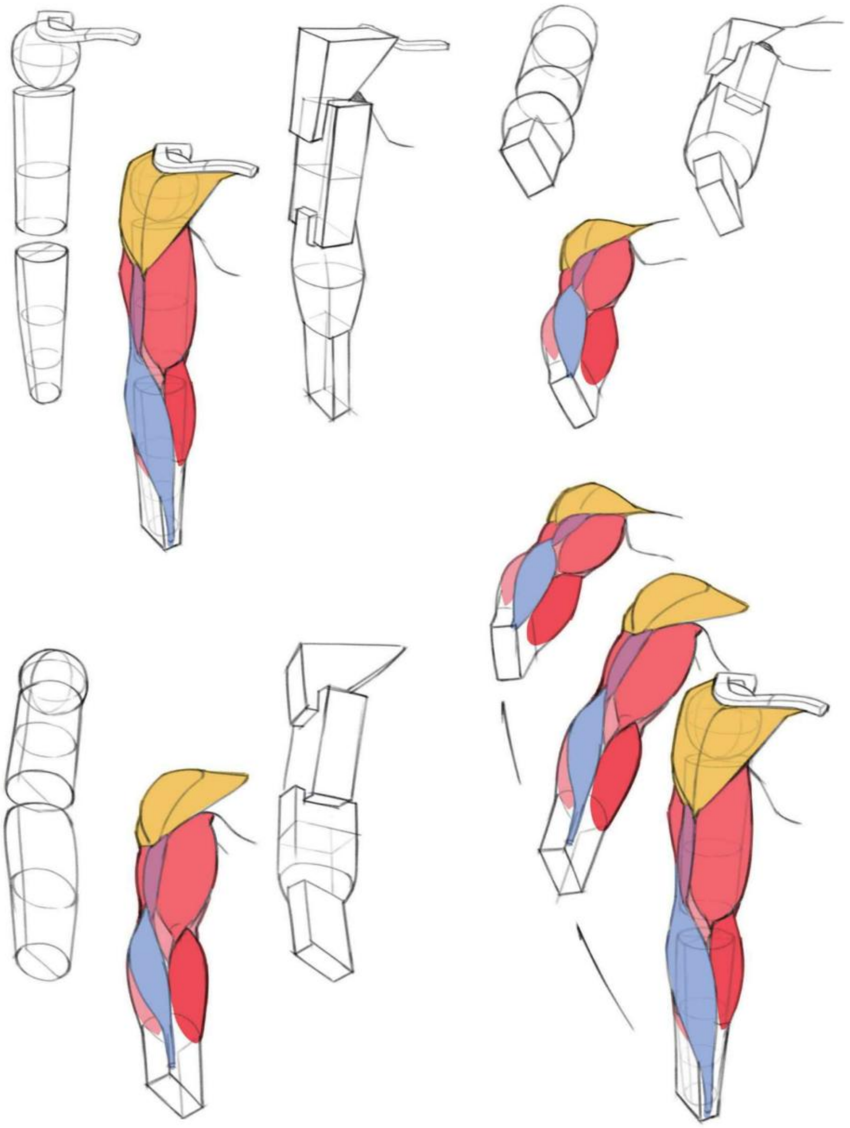
oblique side



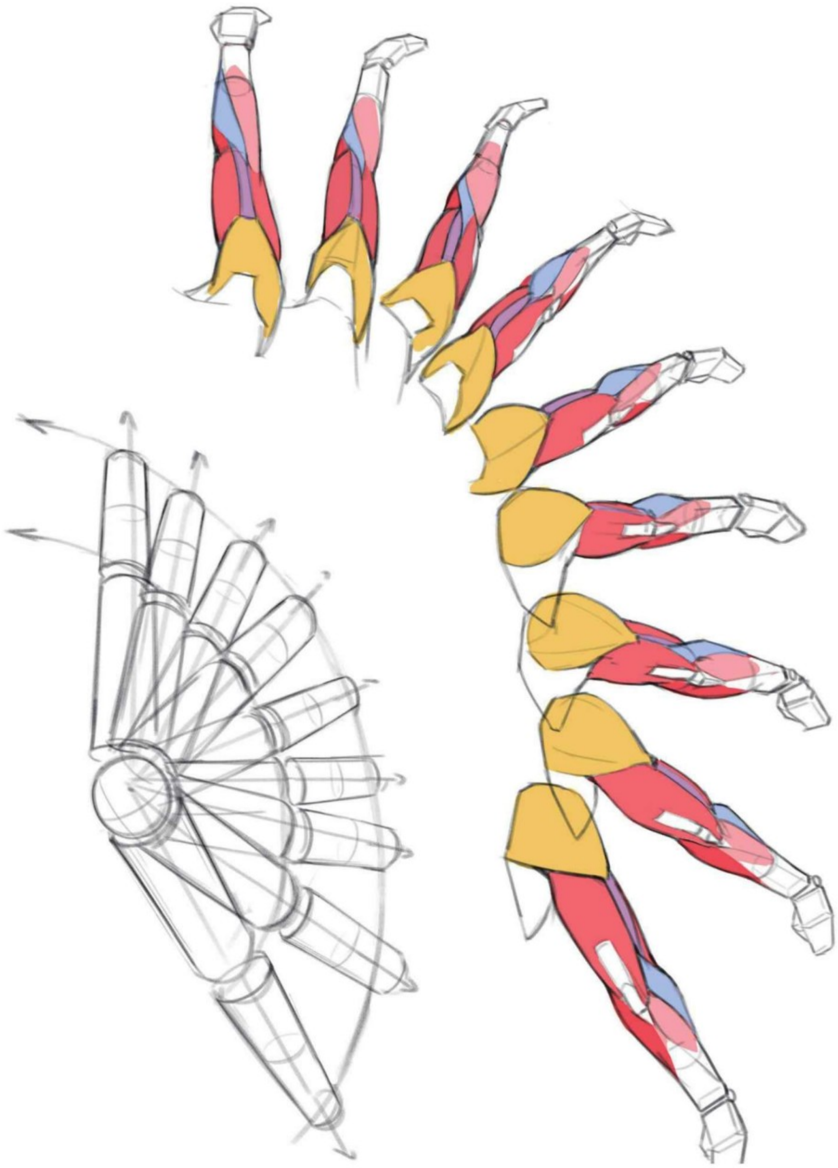
later

When drawing an arm-raising motion, pay attention to perspective compression and the changes in muscle shape at the connection point during the upward movement.

Transformation, such as the changes in the deltoid and pectoralis major muscles, requires a holistic approach to drawing.

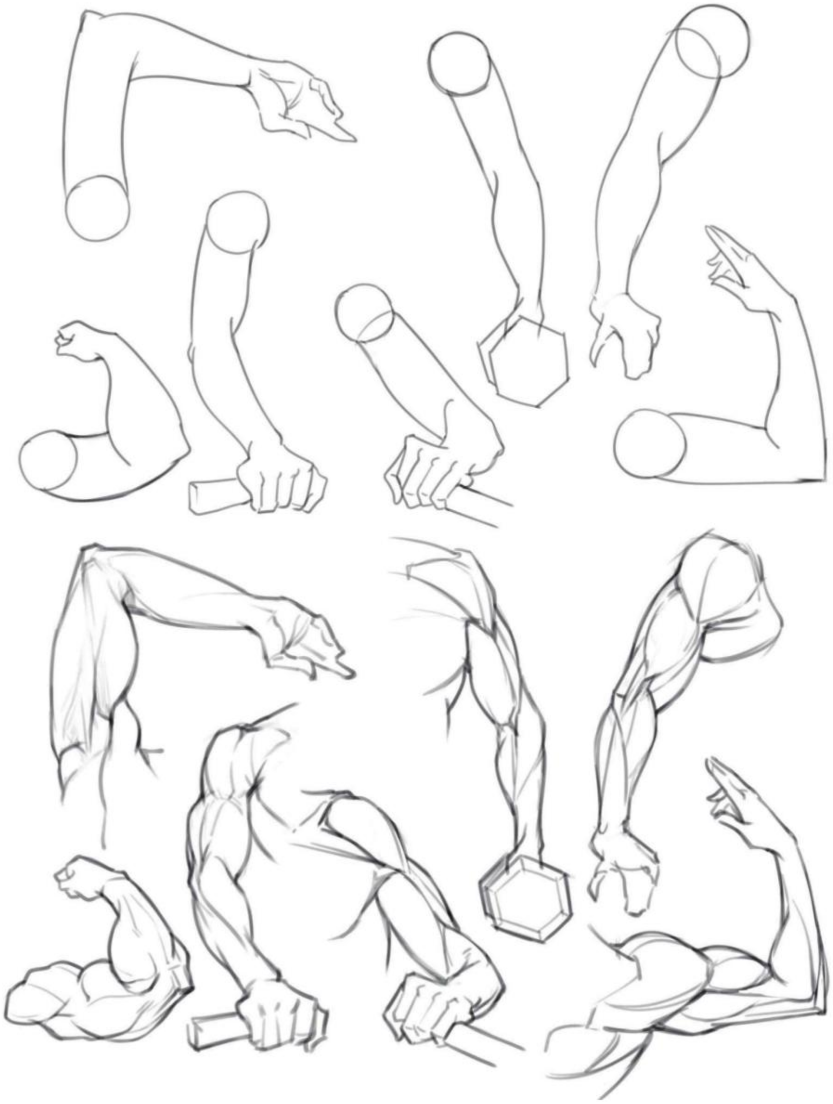


When raising your arm to the side, your arm will rotate slightly.

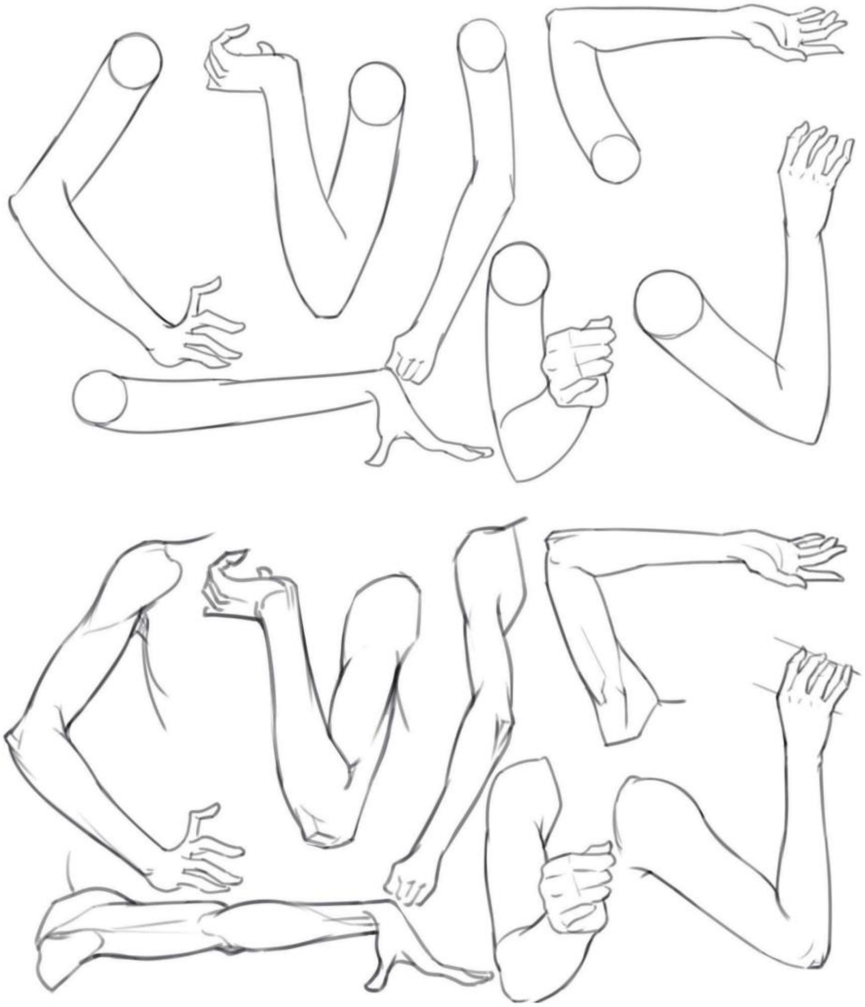


More specialized training

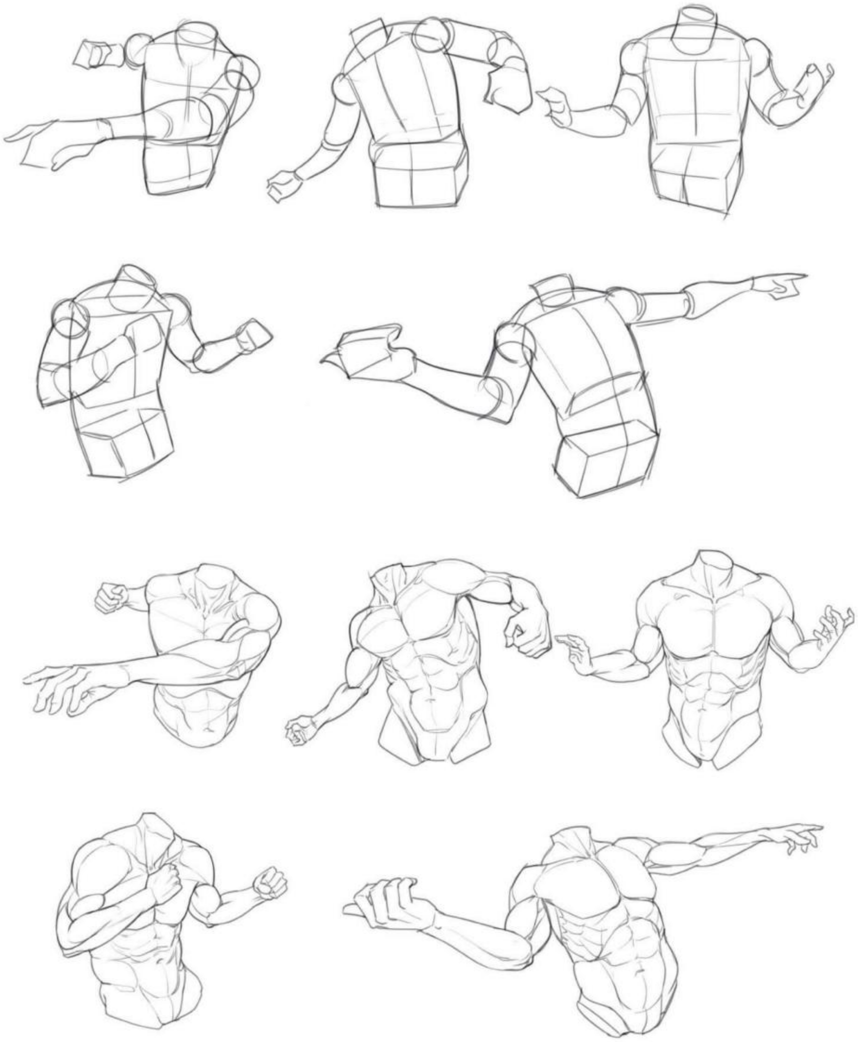
Do a set of exercises to work the structure and muscles of the male arm.



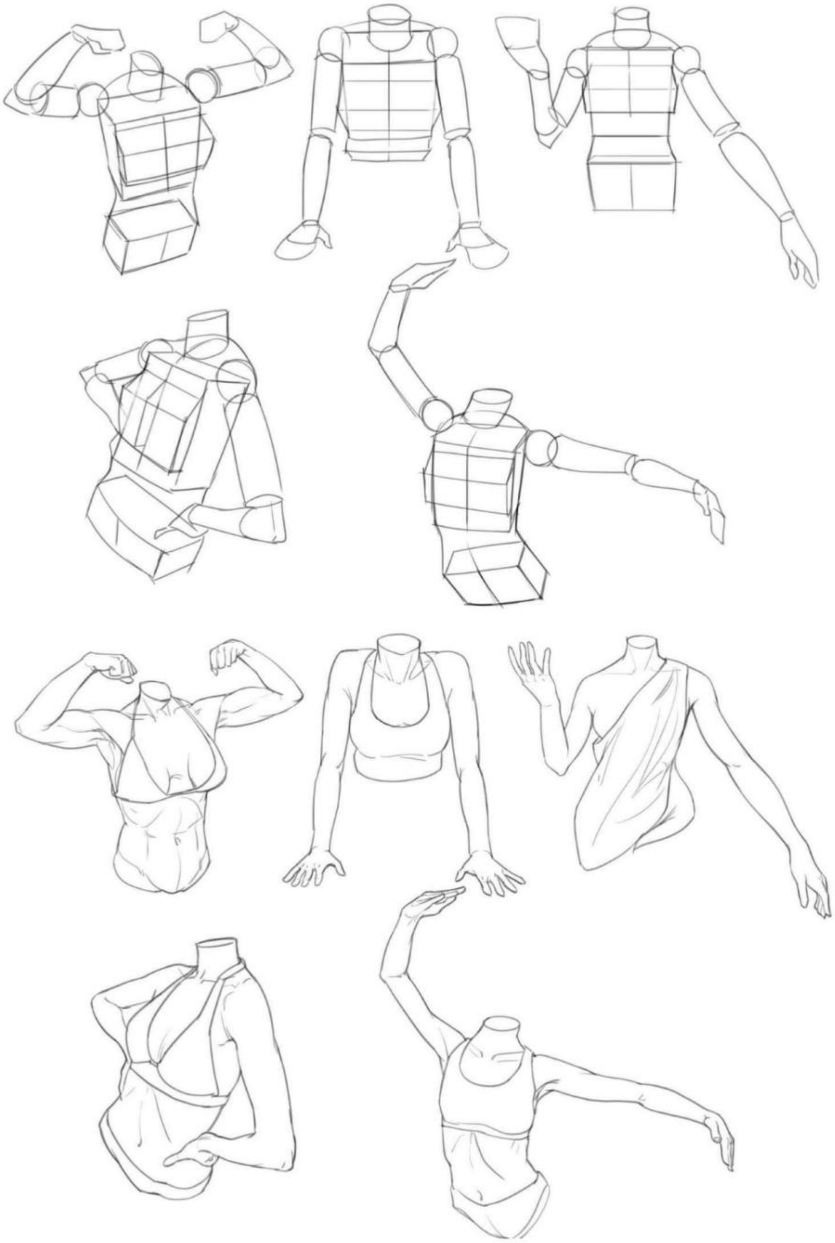
Do a set of exercises to work the structure and muscles of a woman's arm.



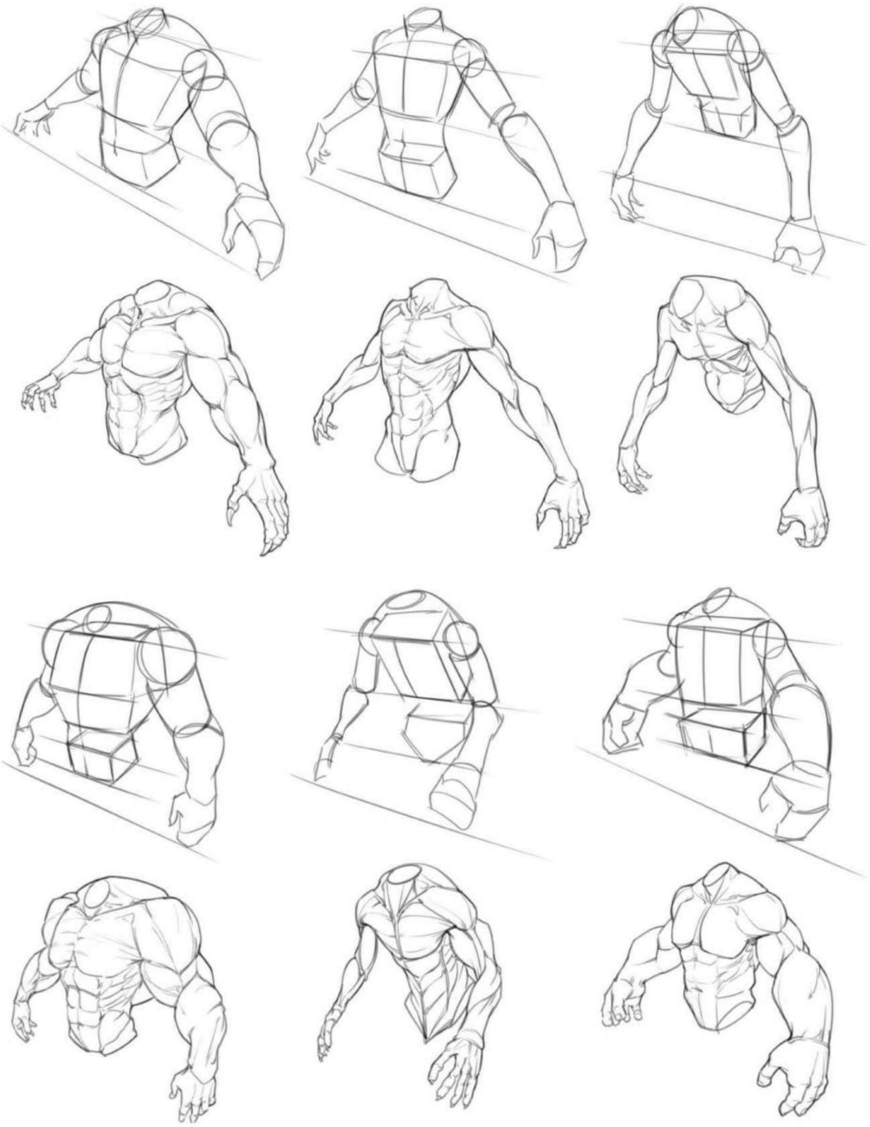
Perform a set of dynamic exercises connecting the male arms and torso.



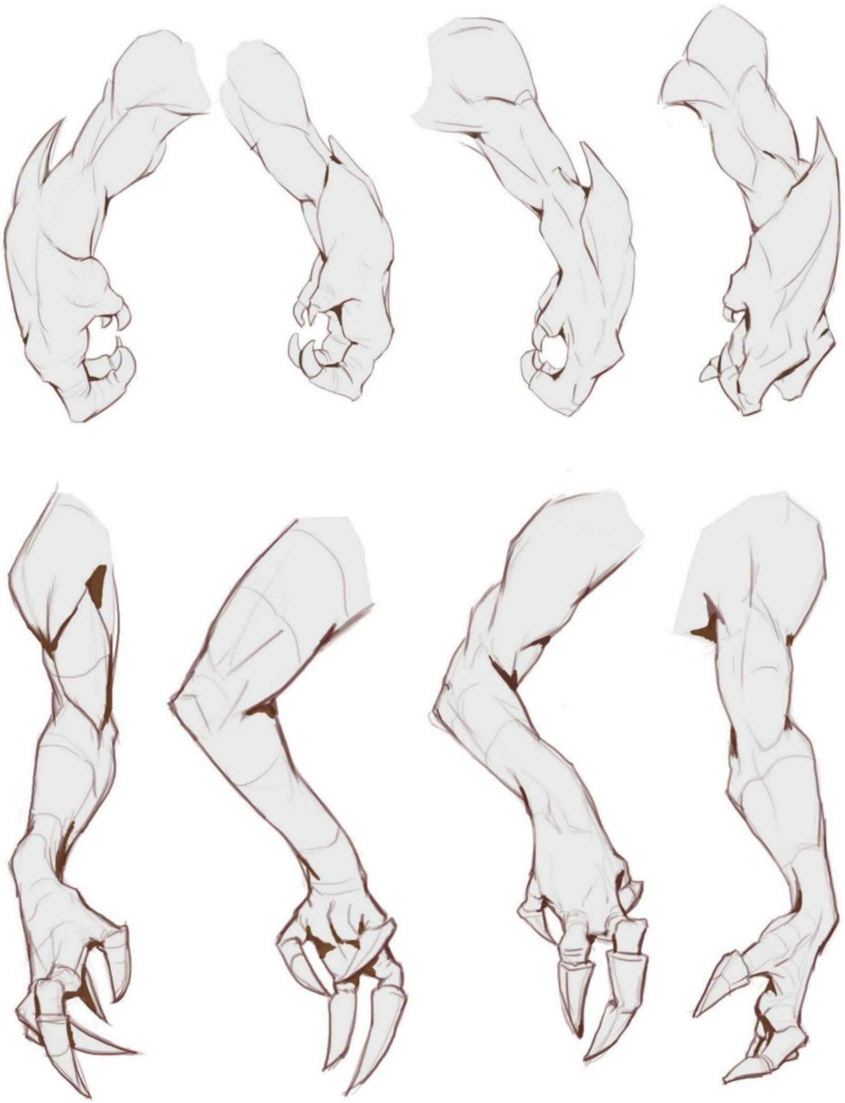
Perform a set of dynamic exercises connecting the female arms and torso.



Do a set of exaggerated arm muscle shaping exercises.



Do a set of arm-deformation rotation exercises.

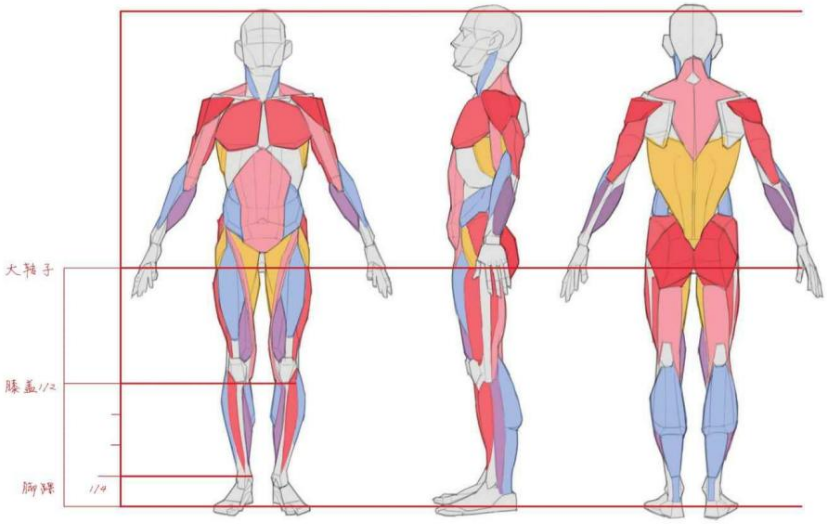


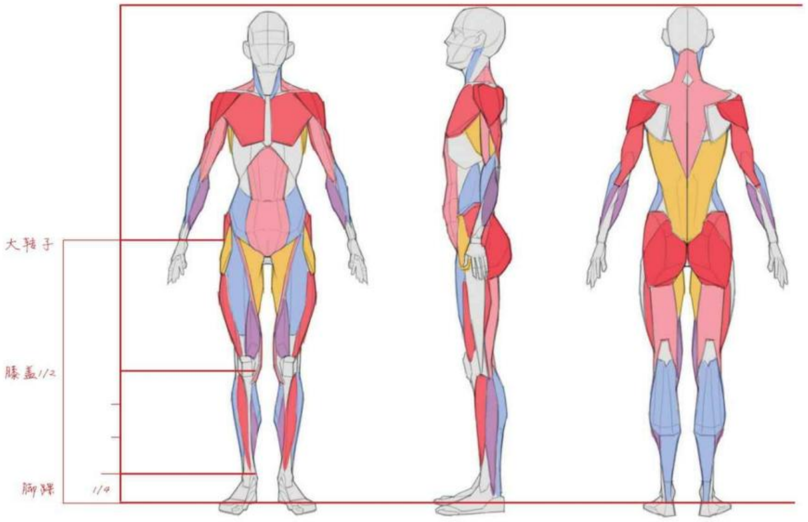
Chapter 4 Leg-Specific Training

leg The legs influence the overall aesthetic appeal of the human form; many graceful poses require coordination with the legs. Performance is essential for showcasing talent. This chapter will focus on the proportions of the legs, the connection between bones and muscles, and the legs themselves.

4.1 Proportional Structure of the Legs

The greater trochanter of the femur divides the upper and lower body into equal parts. Generally, the female lower body is slightly longer than the male lower body. The distance from the greater trochanter to the bottom of the knee is equal to the distance from the bottom of the knee to the sole of the foot, and the height from the ankle to the sole of the foot is about 1/4 of the distance from the knee to the sole of the foot.





4.2 The Influence of Leg Bones and Muscles on Body Surface Appearance

We often see subtle curves in the outline of a person's thighs in excellent paintings.

The lines are varied, and the shapes are very graceful and vivid, but I can never draw them well when I try to sketch them myself.

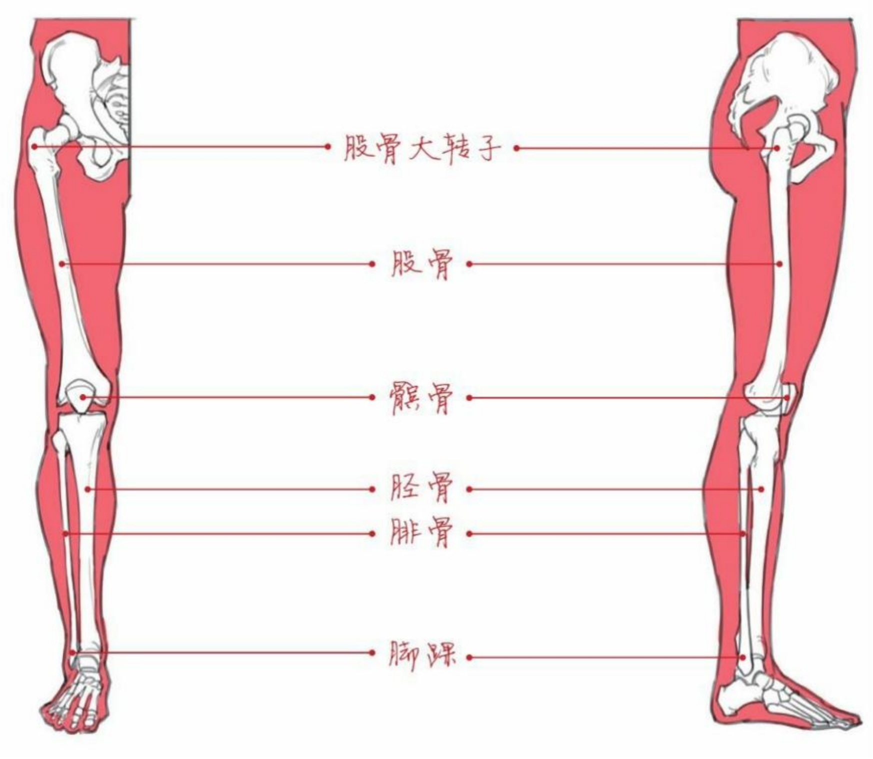
When we observe the portraits of accomplished artists, we notice that certain structures they depict are difficult to find in reality. Beginners often find their own drawings differing from these depictions. This is because these artists have a deeper understanding of leg muscles and joint structures, and during the drawing process, they appropriately exaggerate and distort certain structures based on the dynamic form of the body.

Below, we'll summarize the complex muscles into simple shapes to make it easier for everyone to remember the leg muscles.

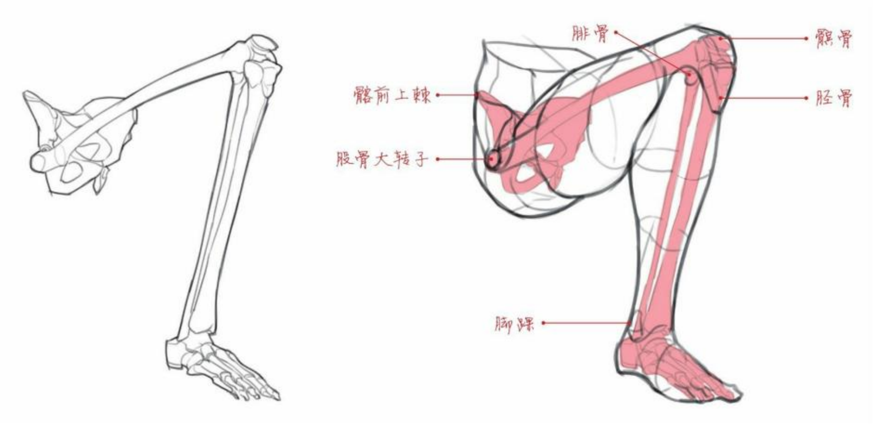
Some important structures, and can understand the influence of these structures on leg shape.

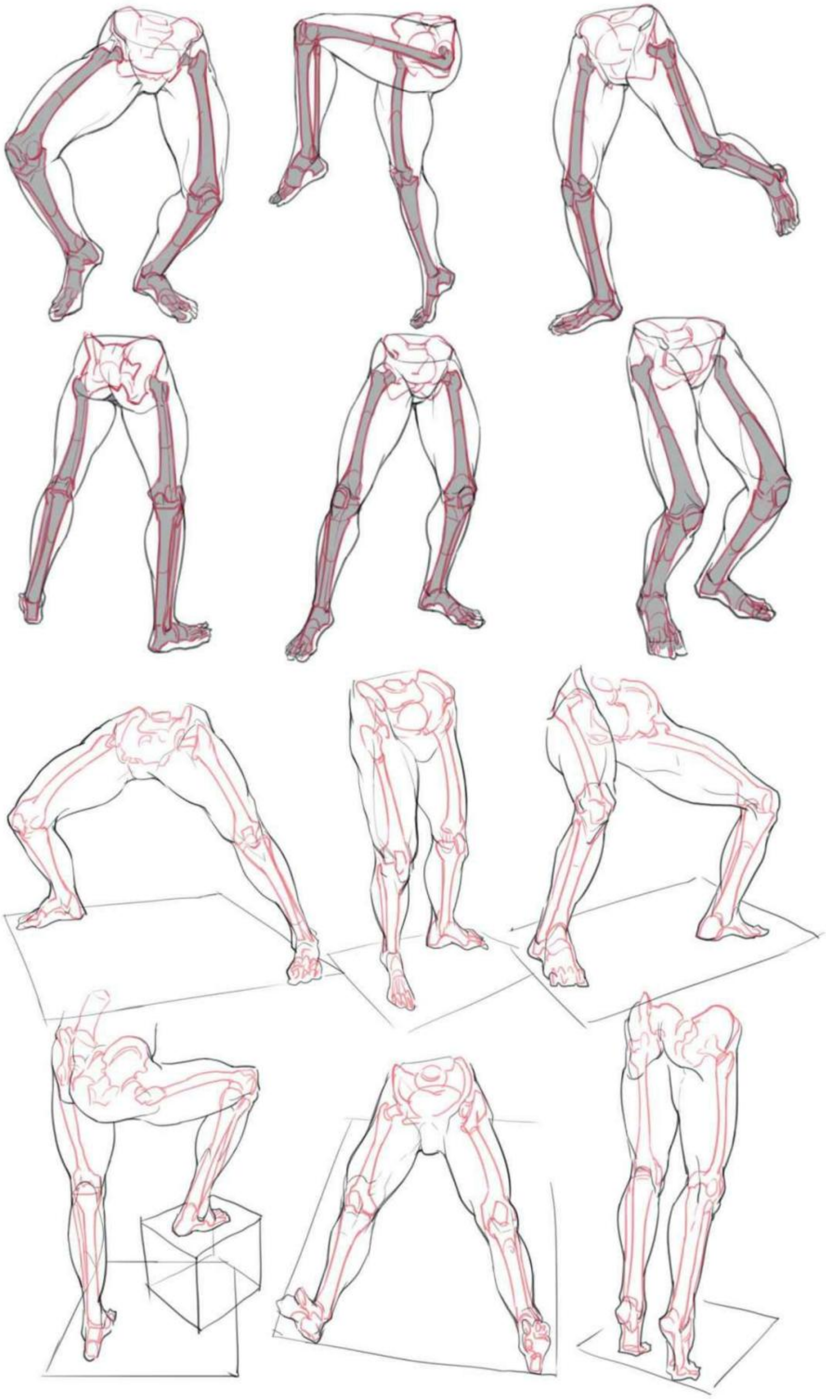
4.2.1 The Influence of Leg Bones on Body Surface Appearance

The leg bone is the framework of the leg; drawing the framework makes it easier to add muscles.


股骨大转子
股骨
髌骨
胫骨
腓骨
脚踝

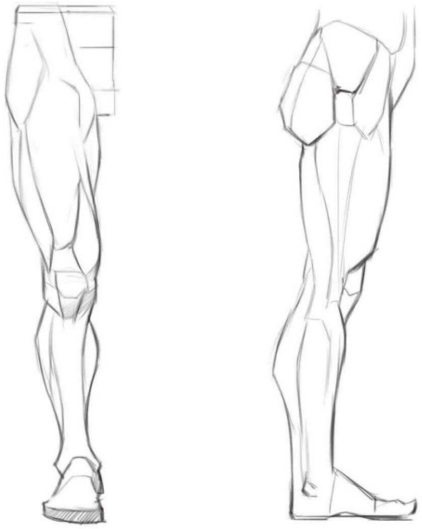
Special attention needs to be paid when drawing areas where bones are visible, as these bony points are not covered by muscles and are therefore highly distinctive. Memorizing the shape of the thigh relies on these bony points, such as the anterior superior iliac spine, greater trochanter of the femur, patella, fibula, upper tibia, and ankle.

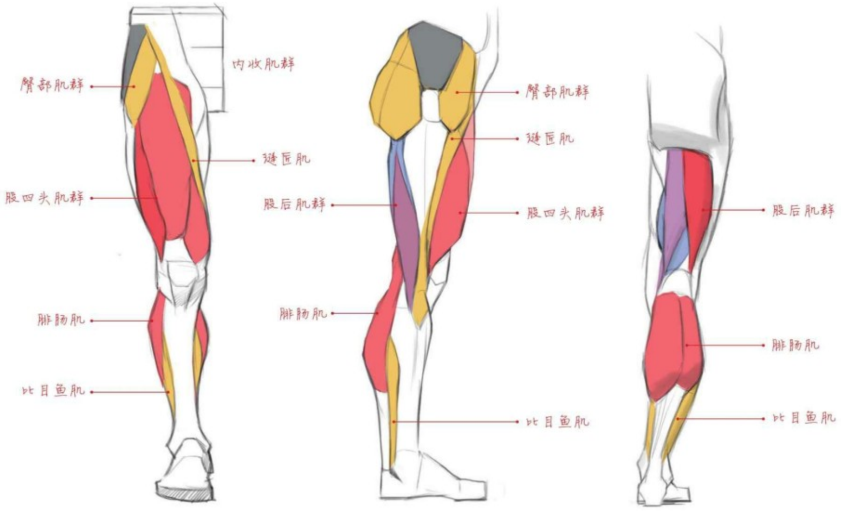

腓骨
髌骨
髂前上棘
胫骨
股骨大转子
脚踝

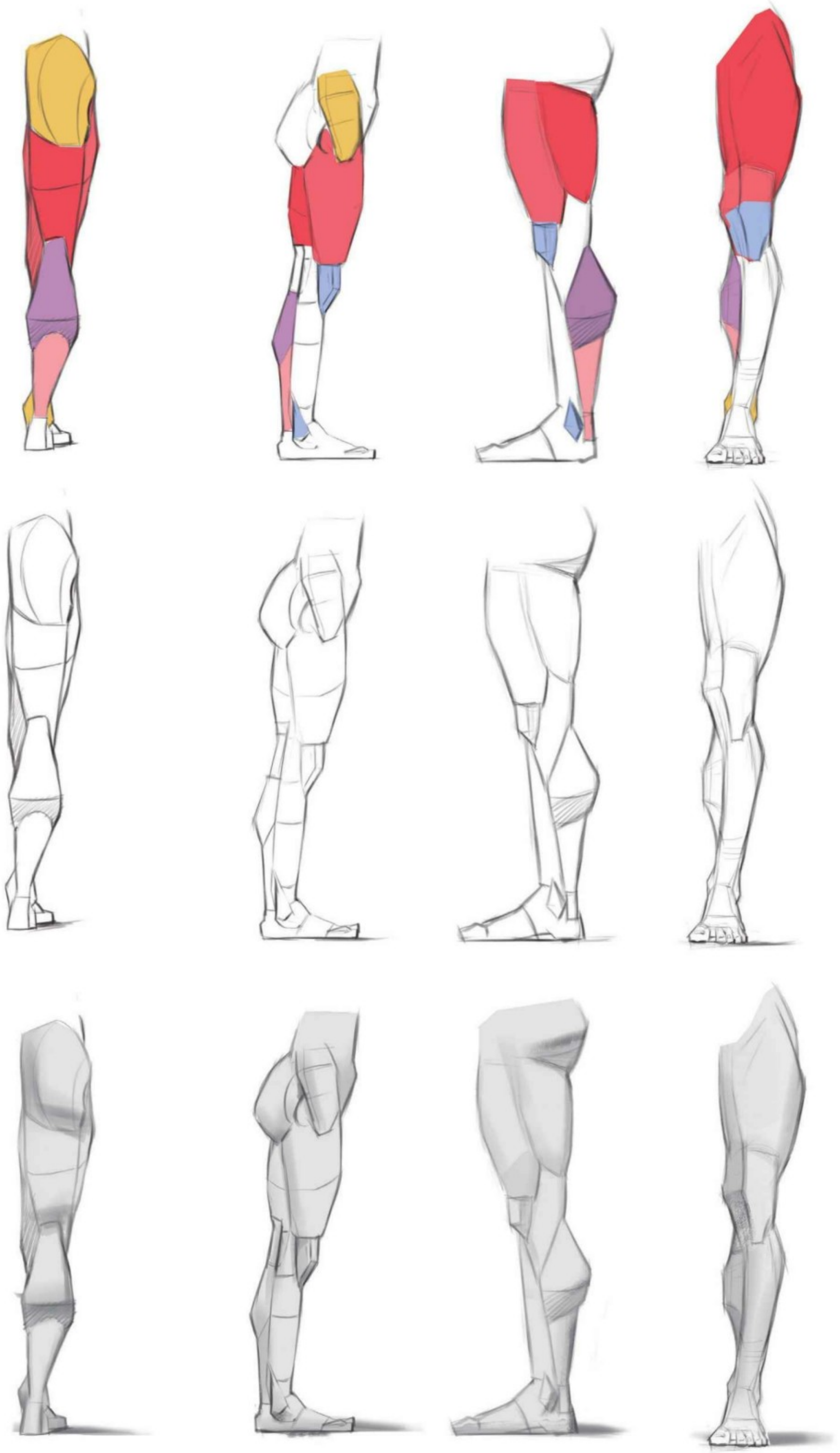


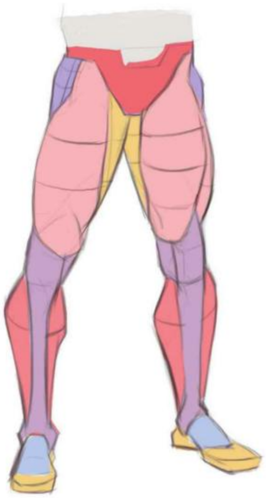
4.2.2 The Influence of Leg Muscles on Body Surface Appearance

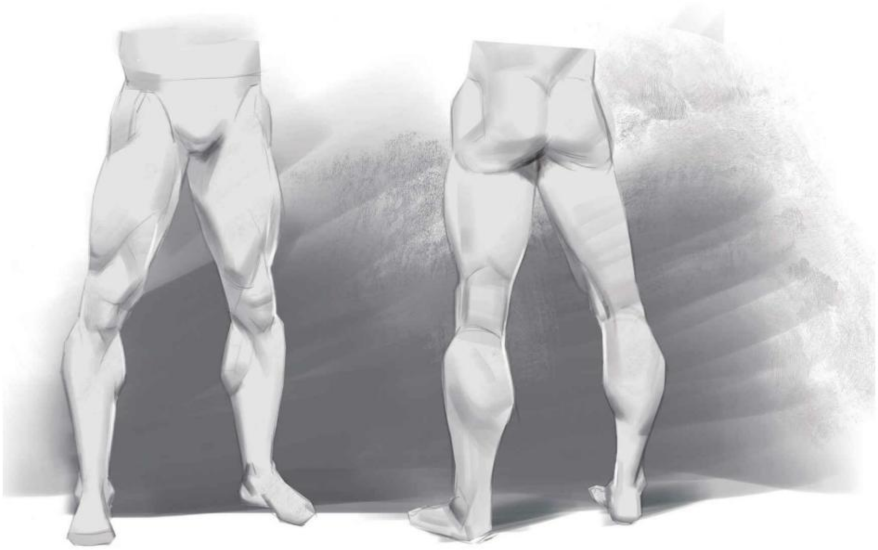
Below, we will briefly learn about the names and shapes of the bones and muscles in the legs.




内收肌群
臀部肌群
缝匠肌
股四头肌群
腓肠肌
比目鱼肌
臀部肌群
缝匠肌
股后肌群
股四头肌群
腓肠肌
比目鱼肌
股后肌群
腓肠肌
比目鱼肌







hint

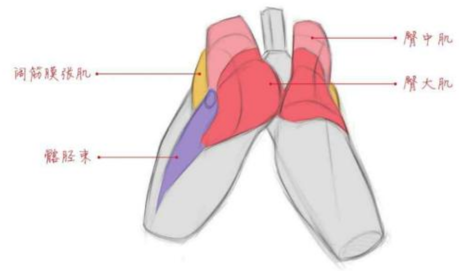
After seeing these complex muscles, don't be intimidated. Break them down into...

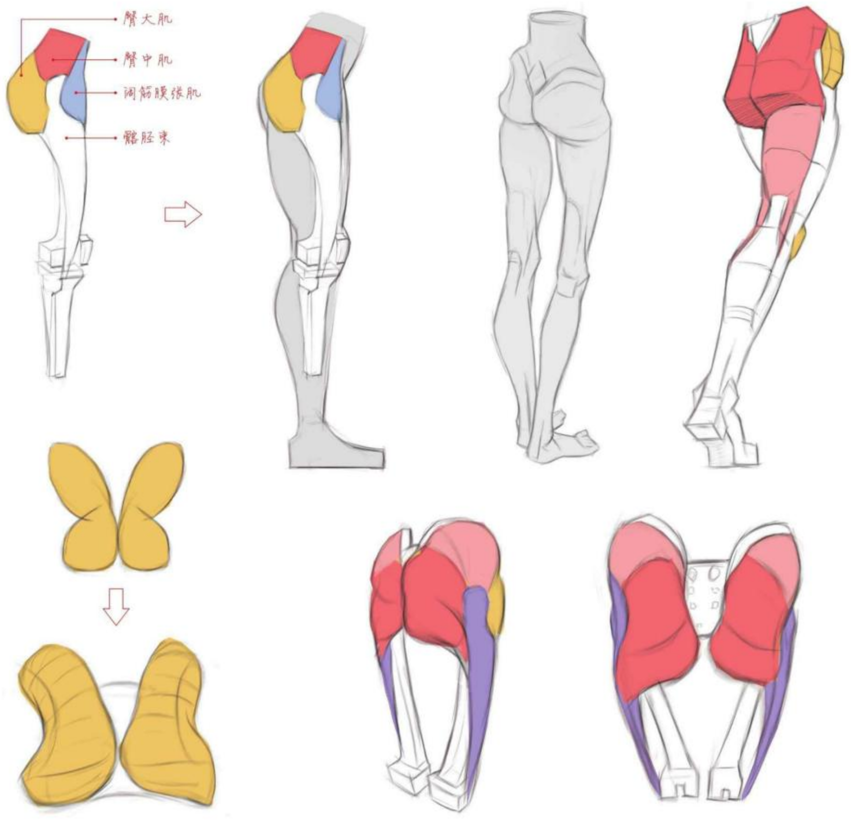
To understand the function of each muscle group and how exercise affects body shape, we need to break it down into six modules.

Can.

- The influence of the gluteal muscles on body surface appearance

The buttocks are the junction of the waist and legs. The thick and wide gluteus maximus, gluteus medius and gluteus minimus muscles are attached to the outside of the pelvis, as well as the tensor fasciae latae muscle on the outer thigh.





The gluteus maximus is quadrilateral in shape and originates from the posterior surface of the ilium, sacrum, coccyx, and sacrotuberous ligament. Its muscle bundles...

It runs obliquely downward and outward, with a thick tendon plate crossing behind the hip joint, and inserts into the gluteal tuberosity and iliotibial band.

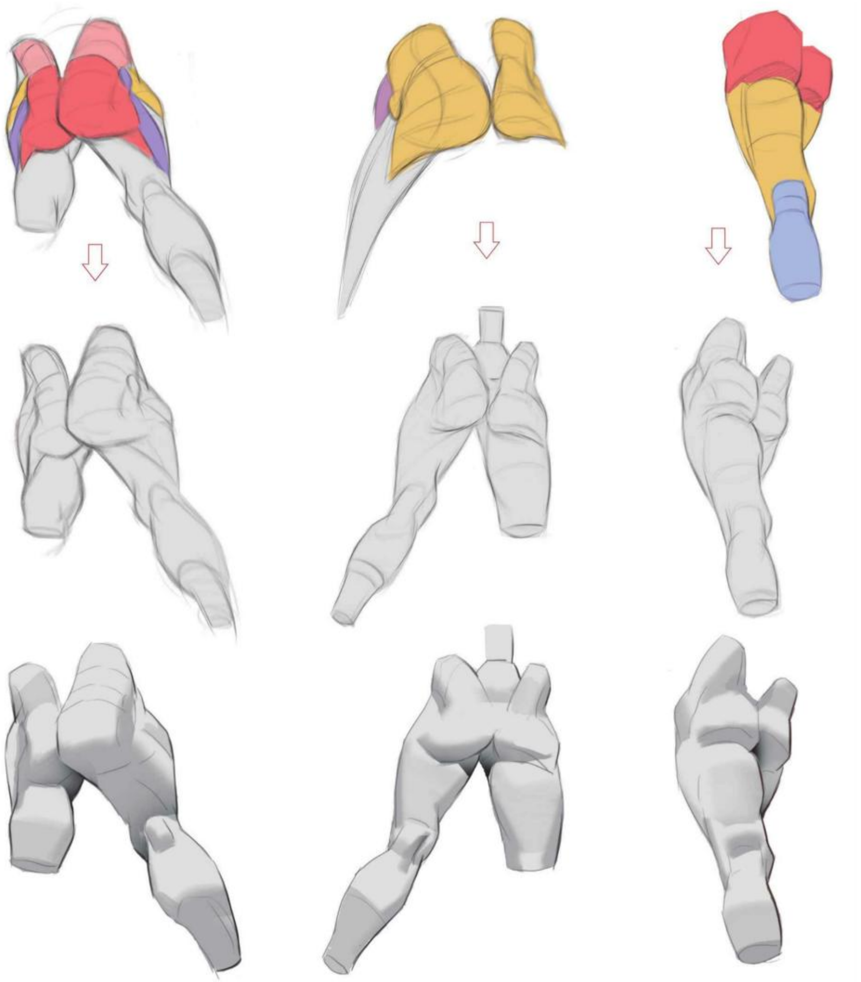
The gluteus medius is located on the outer side of the iliac wing, and its posterior part lies deep to the gluteus maximus. It is responsible for...

Important muscles for maintaining good posture when walking or standing.

The tensor fasciae latae (TFL) is located on the upper anterolateral aspect of the thigh. It originates from the anterior superior iliac spine, and its muscle belly is enclosed between two layers of the fascia lata. It descends to form the iliotibial tract and inserts into the lateral condyle of the tibia. The TFL generates force at the hip joint and stabilizes the pelvic muscles.

The fascia in the greater trochanter region is relatively thick, composed of dense connective tissue, and consists of superficial and deep layers. It is continuous with the myofascia of the quadratus femoris, gluteus medius, and other muscles attached to the greater trochanter, and also with the fascia of the gluteus maximus and the greater trochanter.

The periosteum is connected by loose connective tissue.

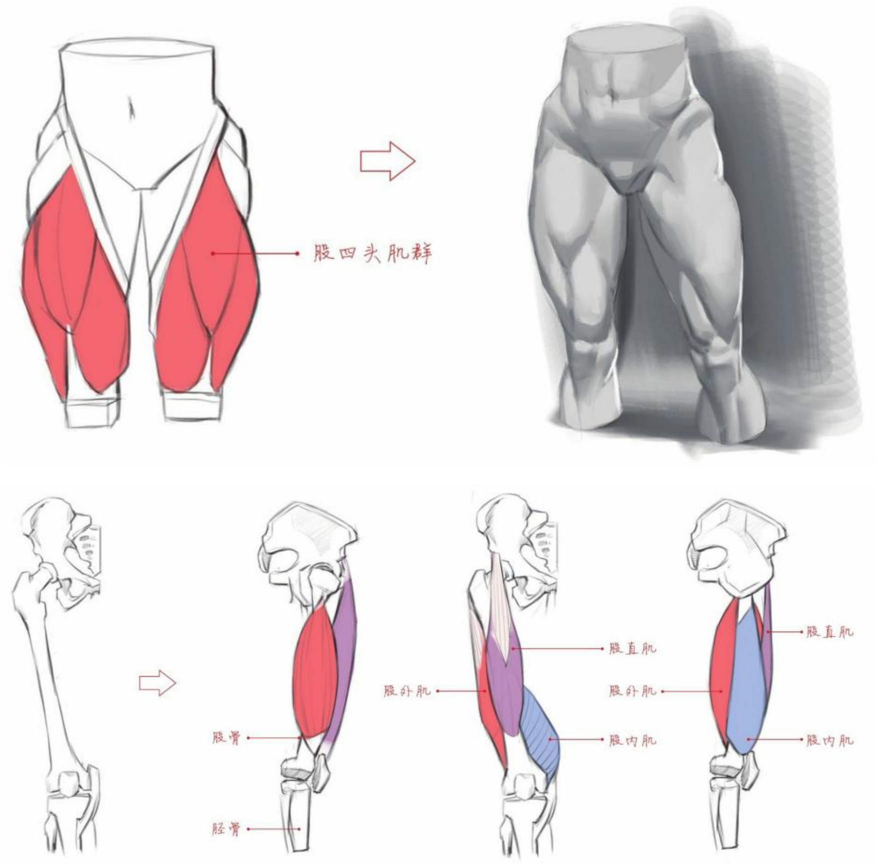


• The influence of the quadriceps femoris muscle group on body surface performance

The quadriceps femoris is located on the front of the thigh and has four heads. Origin: the rectus femoris originates from the anterior inferior iliac spine, the vastus intermedius originates from the anterior surface of the femoral body, the vastus lateralis originates from the lateral lip of the linea aspera of the femur, and the vastus medialis originates from the medial lip of the linea aspera of the femur.

Insertion: The four heads merge into a single tendon, wrapping around the patella and extending downwards to form the patellar ligament, where it stops. At the tibial tuberosity.

Function: When the proximal end is fixed, the rectus femoris can flex the hip joint and extend the knee joint when the whole body contracts; when the distal end is fixed, it extends the thigh at the knee joint and maintains the upright posture of the human body.



Muscle structure diagram

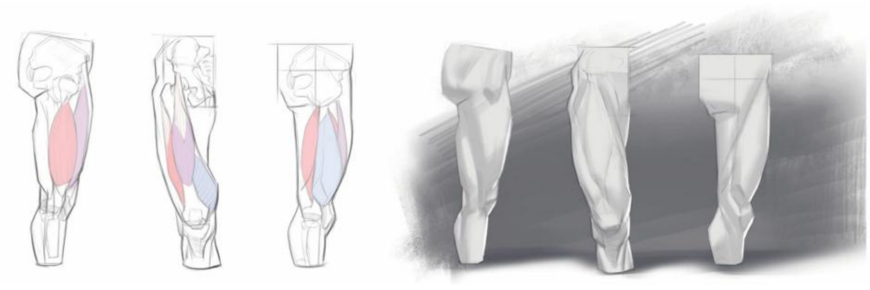


Diagram showing the relationship between muscles and the body surface

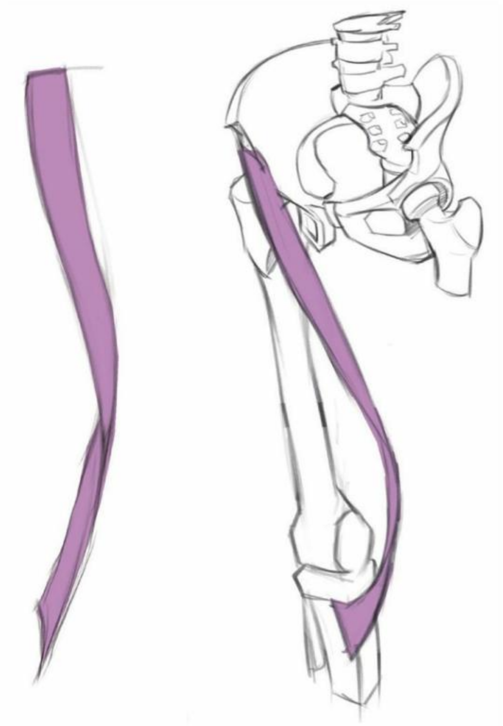
• The influence of the sartorius and adductor muscle groups on body surface performance

The sartorius muscle is located in the superficial layer of the anteromedial thigh. Its muscle fibers run obliquely from the upper outer side of the thigh to the lower inner side, making it the longest muscle in the human body. Origin: Anterior superior iliac spine. Insertion: Medial surface of the tibial tuberosity.

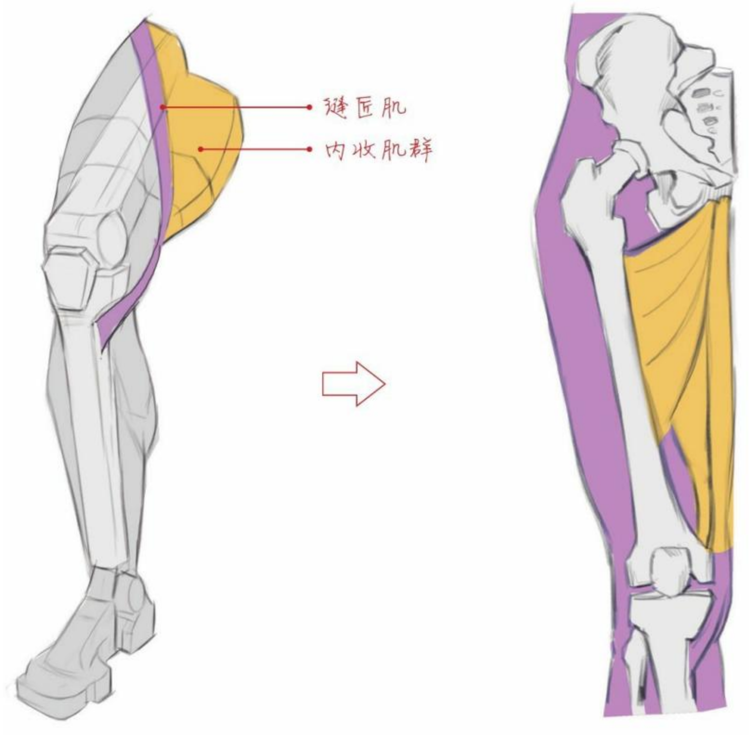
Function: When the proximal end is fixed, it flexes and externally rotates the hip joint and flexes and internally rotates the knee joint; when the distal end is fixed...

At regular intervals, contract both sides to tilt the pelvis forward.

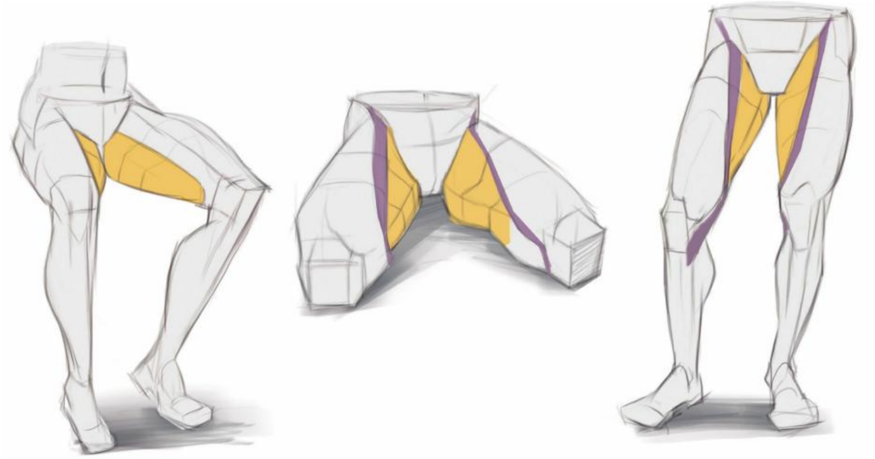
We can think of the sartorius muscle as a long strip of paper that wraps around the pelvis and the upper part of the tibia.



The main function of the adductor muscles is to adduct the thigh and externally rotate the femur. Among them, the gracilis muscle, together with the pes anserinus tendon, performs knee flexion and internal rotation, while the adductor magnus muscle of the ischial region, together with the hamstrings and gluteus maximus, extends the hip.

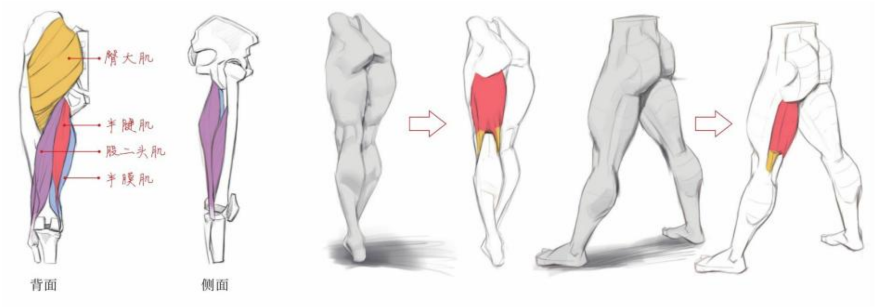


The dynamic structure of the adductor muscle group and sartorius muscle is shown below.

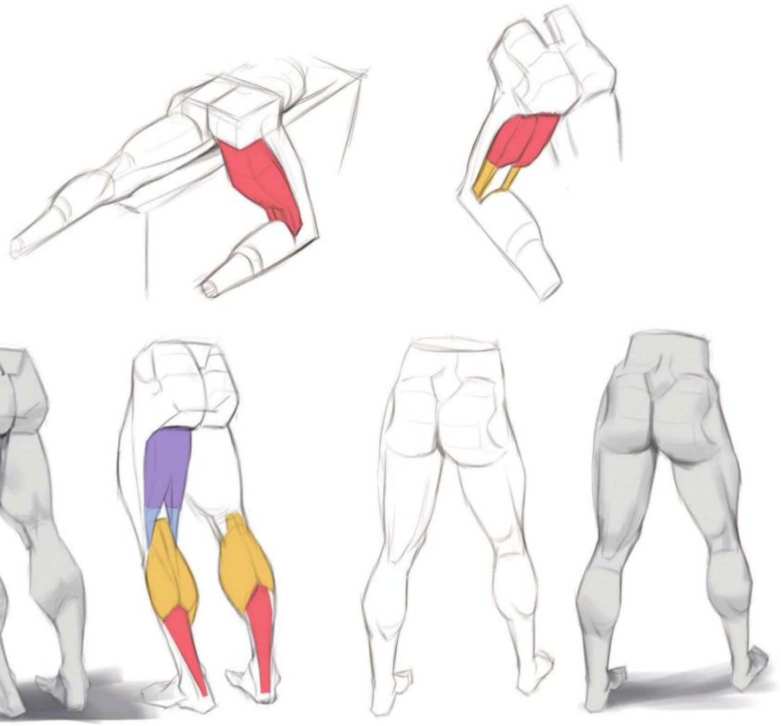


• The influence of the hamstring muscles on body surface performance

The hamstring muscles consist of three vertically downward-pointing muscles, the gluteus maximus. Their main function is to flex the knee joint and extend the hip joint. The anatomical structure of the hamstring muscles is shown below.



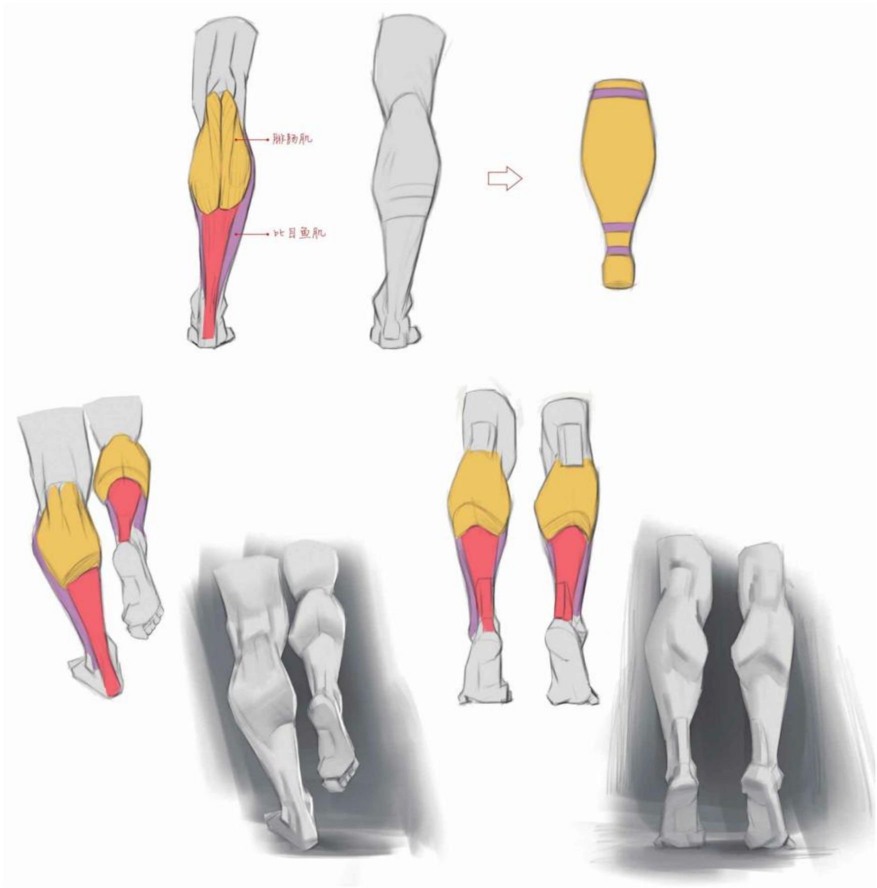
The dynamic structure of the hamstring muscles is illustrated below.



• The influence of the calf triceps on body surface appearance

The triceps surae muscle is divided into the gastrocnemius and soleus muscles. The soleus muscle originates from the posterior part of the upper end of the tibia and fibula. The soleus muscle line of the tibia leads to the muscle bundles that descend to become tendons. The three heads converge to form the bulging calf muscle in the upper part of the lower leg, continuing downwards as the Achilles tendon, which inserts into the calcaneal tuberosity.

In practical terms, you can imagine your calf as the shape of a bowling pin. The dynamic structure of the calf triceps muscle is illustrated below.



hint

When drawing light and shadow, the structural transitions of muscles determine the division between light and dark areas, so mastering structure is very important.

• The impact of the knee on physical appearance

The skeletal structure of the knee consists of four parts: the femur, tibia, patella, and two ligaments. Upon closer inspection, we can see that the femur

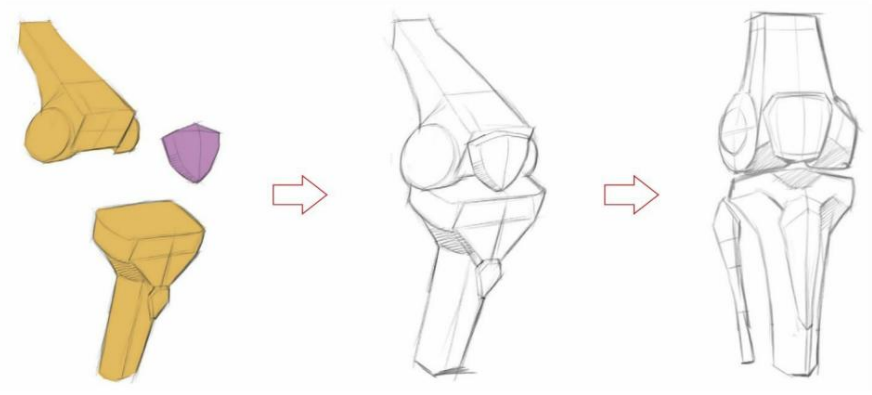
resembles a pulley with two wheels.

The surface is relatively flat, and the bottom has a groove.

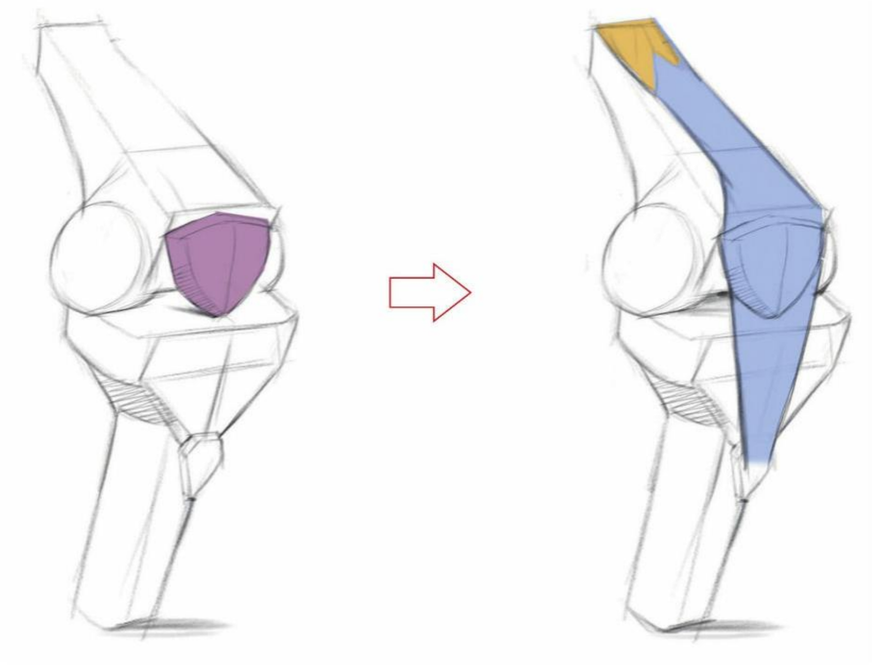
The shinbone is composed of two bones, one large and one small. Upon close inspection, you'll notice that the shinbone looks somewhat like... A small platform allows the femur to move, and the knee moves in this way, like a pulley system. Note that because the femur is flat on the front and concave on the back and bottom, when the leg...

When bent, the grooved part will be exposed at the front.

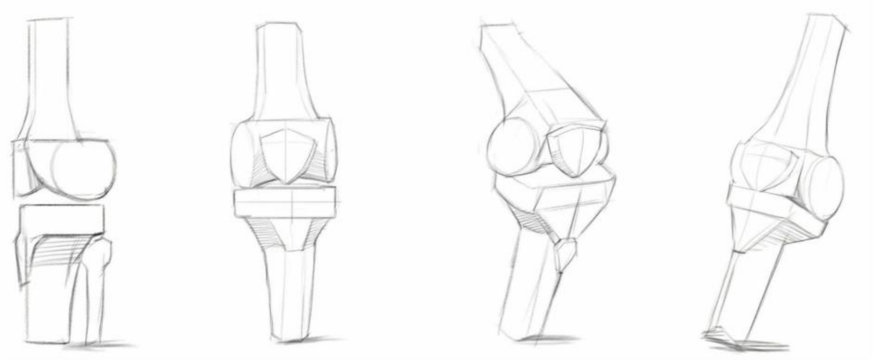
The kneecap is connected between the thigh and calf by two ligaments, one above and one below, and its function is to provide a fulcrum for the pulley system.



How to draw knees

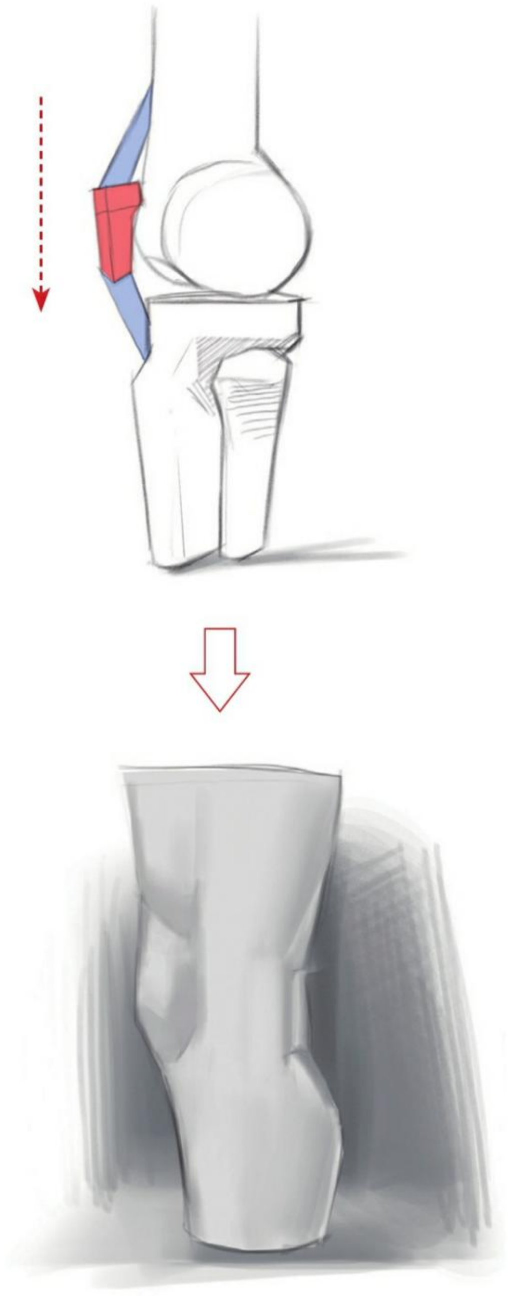


Patellar ligament

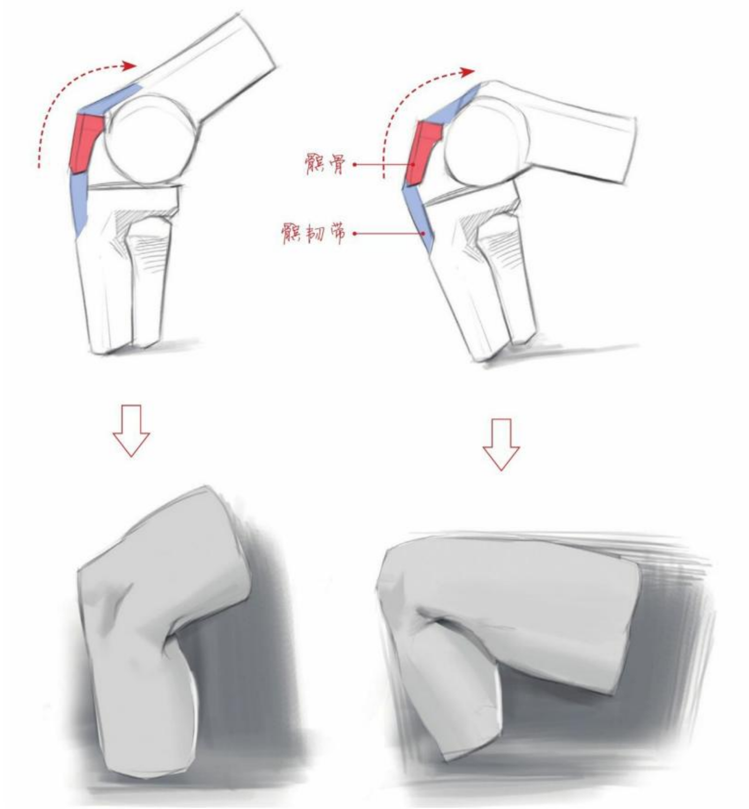


Knee structure at different angles

When the leg is straight, the kneecap is not located at the junction of the femur and tibia, but rather in a higher position. When the leg is bent, the groin area is exposed due to the stretching of the ligaments.

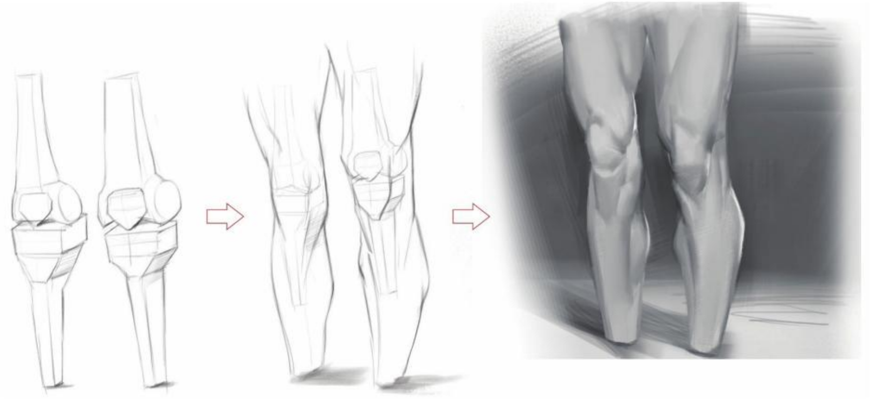


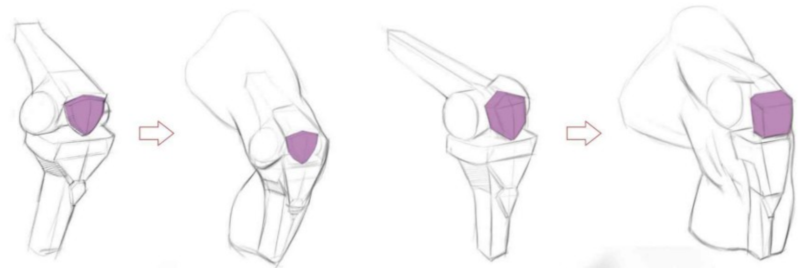
Straight

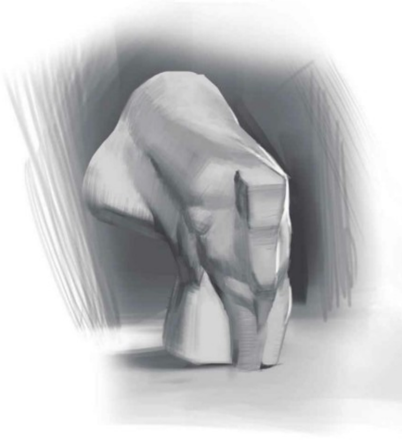


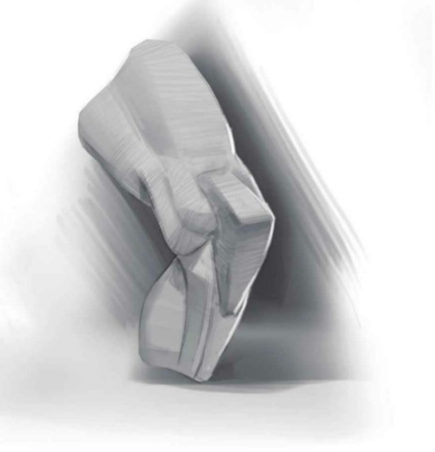
Bending state

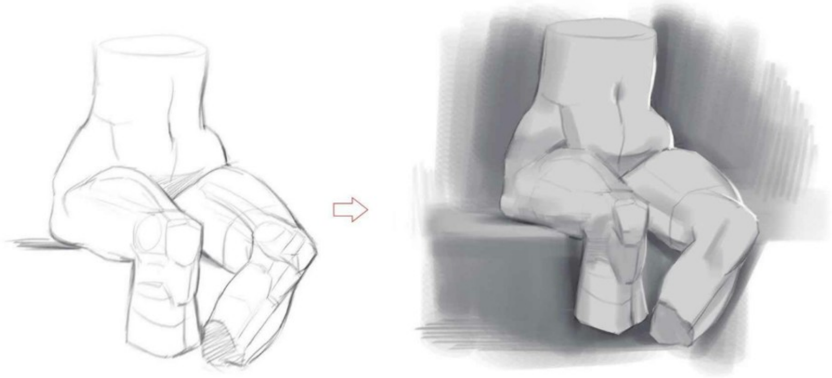
The anatomical analysis of the kneecap is as follows.

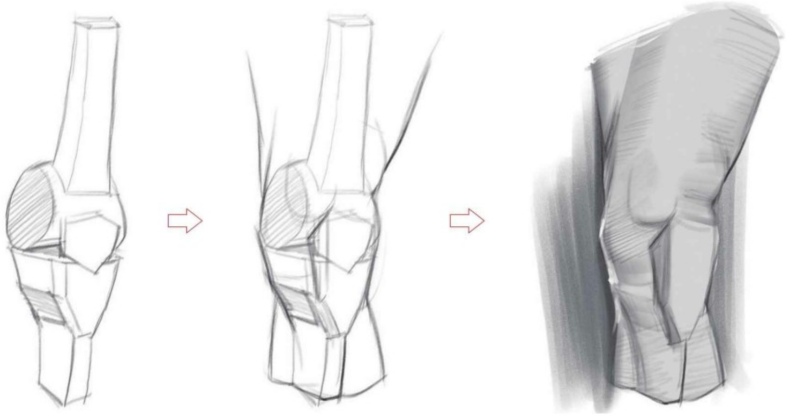


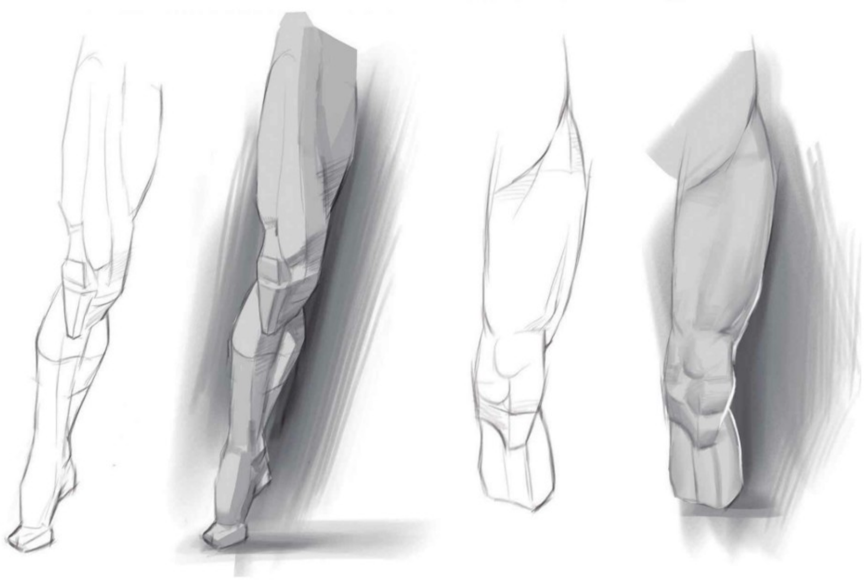








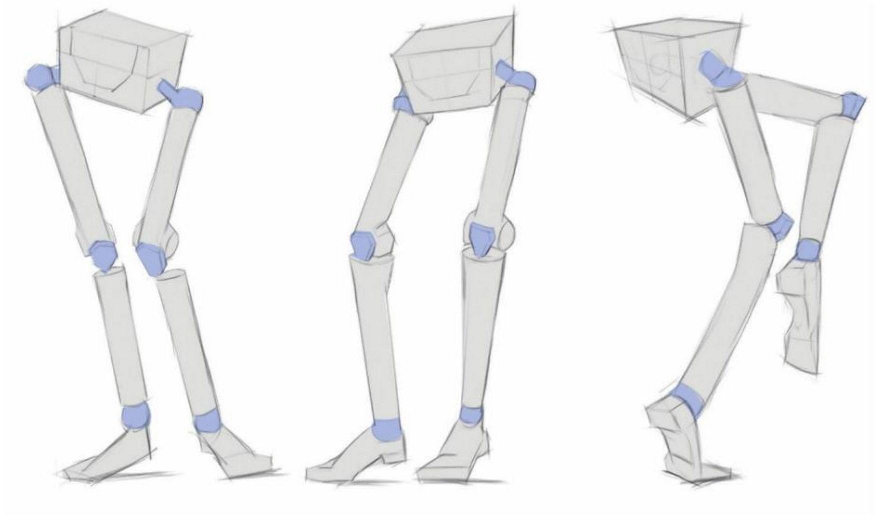




4.3 Connection between the legs, pelvis, and feet

In daily life, leg movements directly affect the pelvis and feet. Therefore, we need to understand how the pelvis and thighs are connected and how they influence each other during movement. Let's first understand the connection between the legs and pelvis, and their

movement patterns. Imagine the legs as cylinders growing downwards from a cuboid, making different movements through the twisting of the hips and knees.



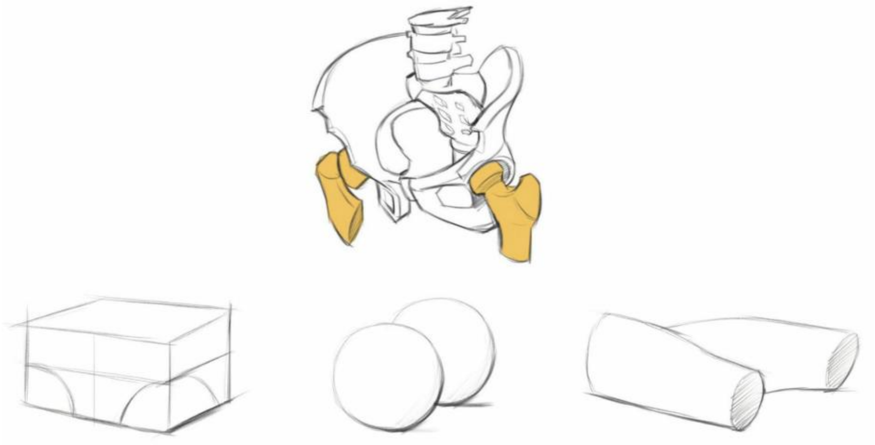
The pelvis is the connecting point between the spine and the femur, and is also an important bone in the human body that connects the upper and lower body.

structure.

4.3.1 Connection between the legs and pelvis

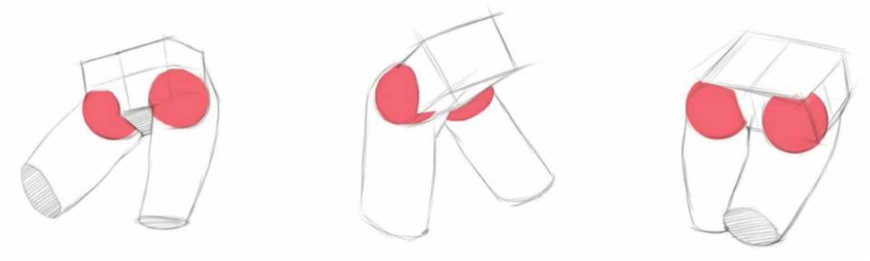
Here we simplify the complex structure into a cuboid (pelvis) and two spheres (pelvis and...).

The torsional axis between the femurs), and two cylinders (femurs).

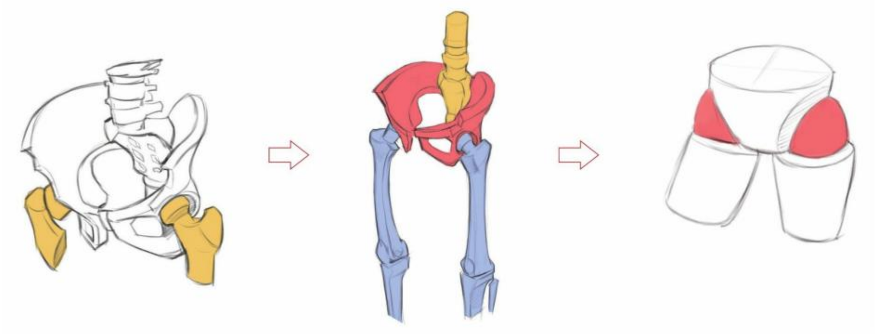


By piecing together simplified body blocks to create dynamic poses, we can better understand people.

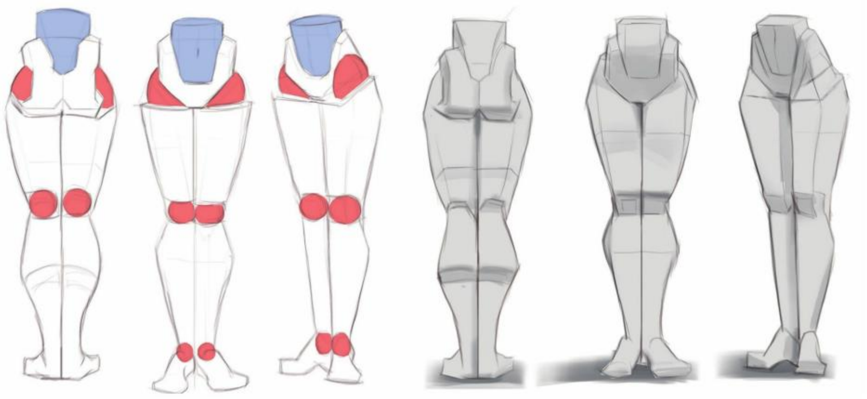
The laws governing the movement of the body.



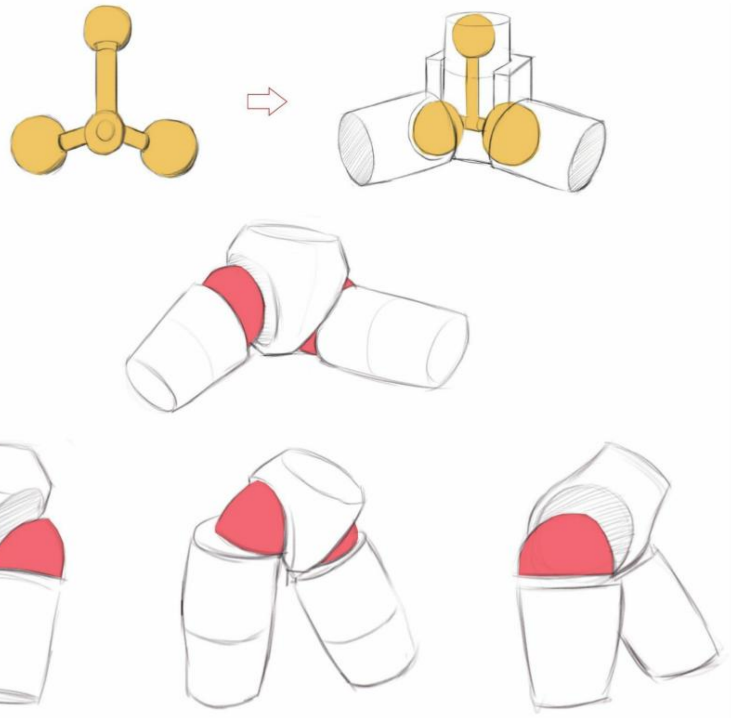
When drawing the human body, we can further subdivide the shape of the pelvis to make the form more realistic.



The following is a summary of leg poses from different angles.

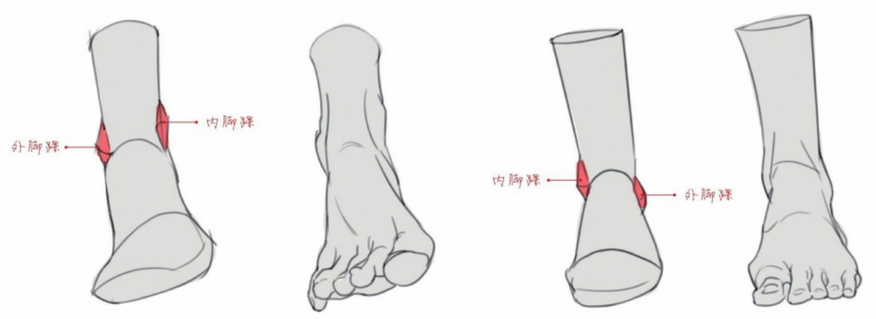


When depicting legs in motion, it's important to note that the range of motion is limited, as people don't typically make large twisting movements in daily life.



4.3.2 Connection between legs and feet

When depicting the connection between the legs and feet, pay attention to the height difference between the inner and outer ankles. Generally, the inner ankle is higher than the outer ankle, presenting a state of inner high and outer low.


外脚踝
内脚踝
内脚踝
外脚踝

4.4 Leg Twisting and Dynamic Performance

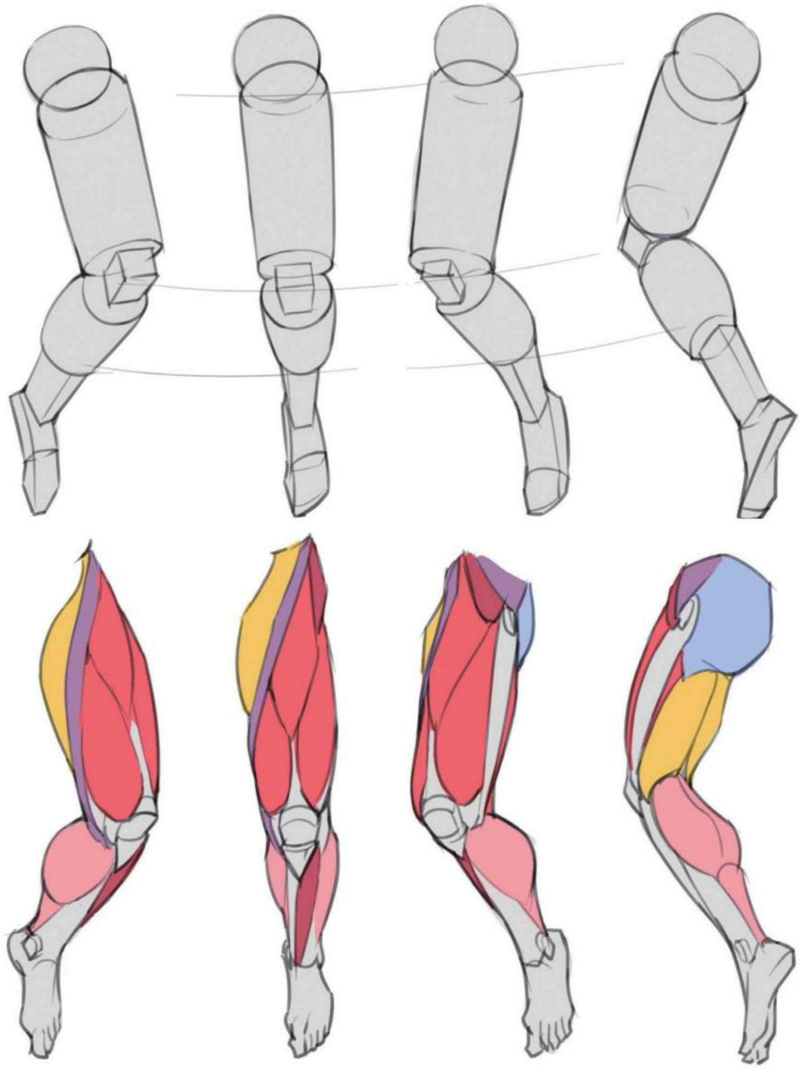
After understanding the skeletal and muscular structure of the legs, it is also necessary to conduct some research on the perspective and stretching deformation of the leg muscle structure in different rotational states.

4.4.1 Leg twisting

You can think of the leg as a cylinder, and pay attention to the proportions and perspective changes of the cylinder when drawing it.

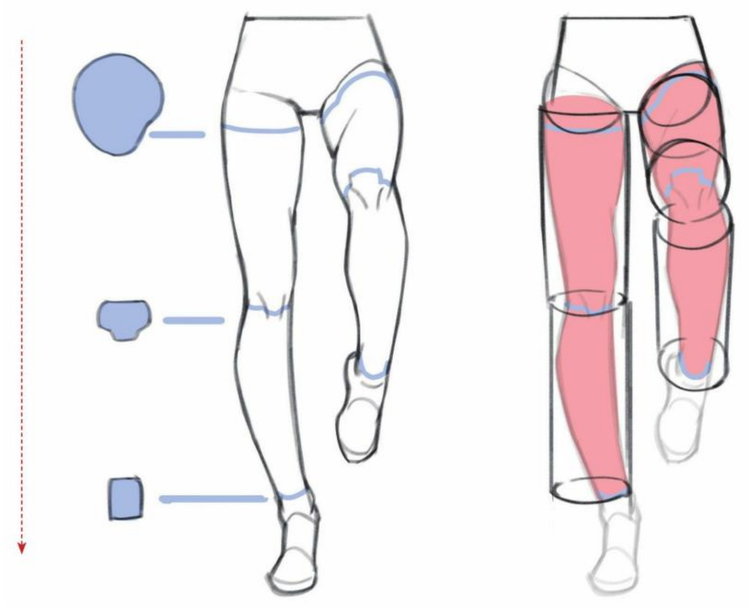
Use a cube to separate the two parts of the cylinder at the knee, and then add the leg muscle structure you want to draw inside the cylinder.

This way you can reproduce the shape of the leg from various angles.



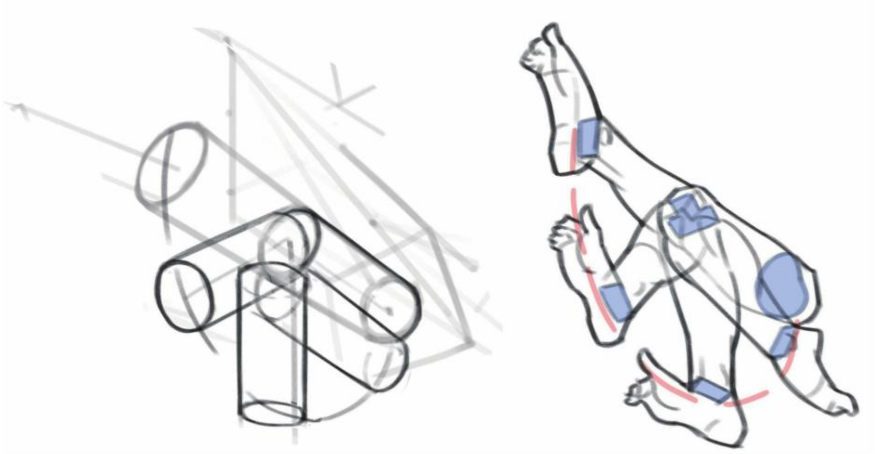
When drawing a woman's legs in a twisted position, draw less muscle structure; just draw as if you were drawing...

The arms, for example, showcase key muscle structures.



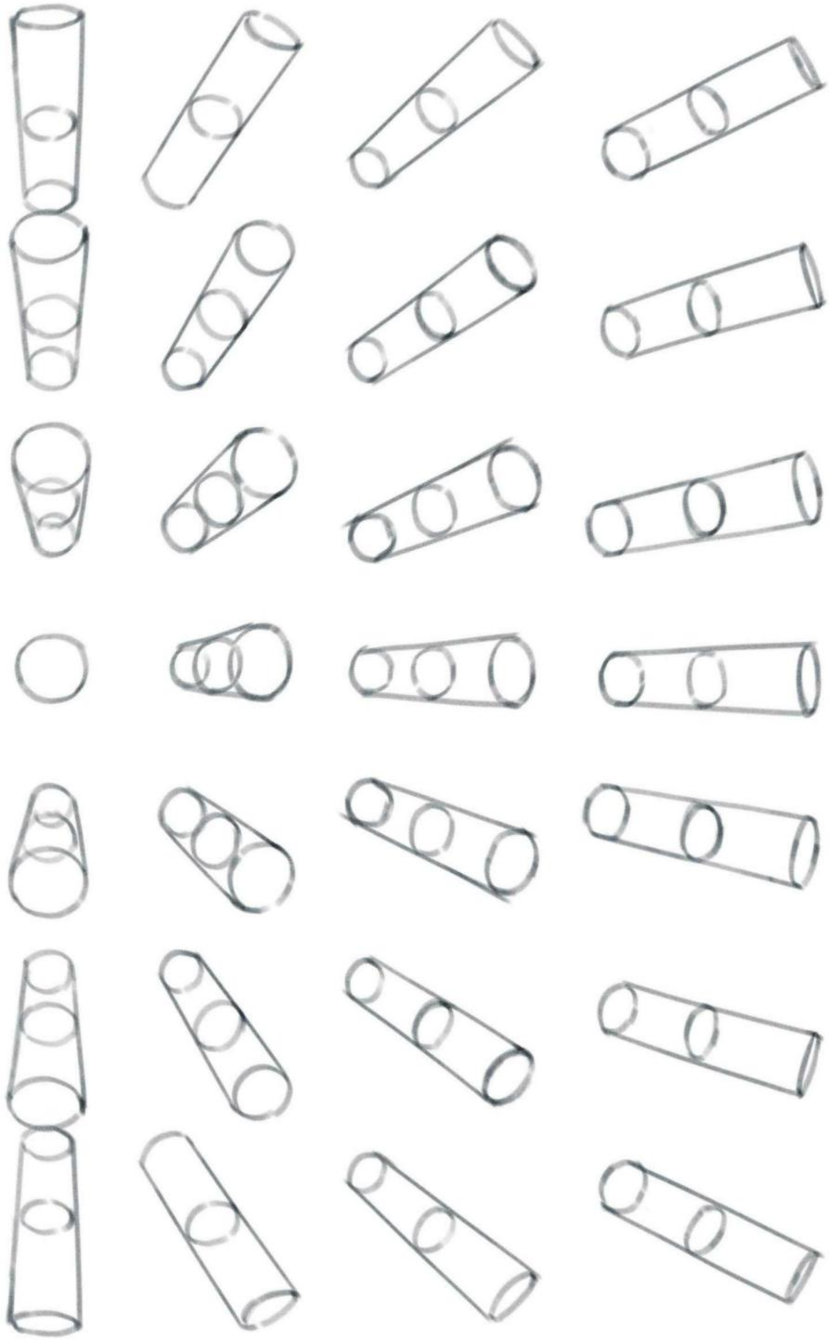
Draw a cross-section on the corresponding leg structure to calculate the shape changes of the leg at various angles. To represent a bent leg, you can also use the bending trajectory of the cylindrical structure of the lower leg to deduce...

Calculate the shape of the leg after bending.



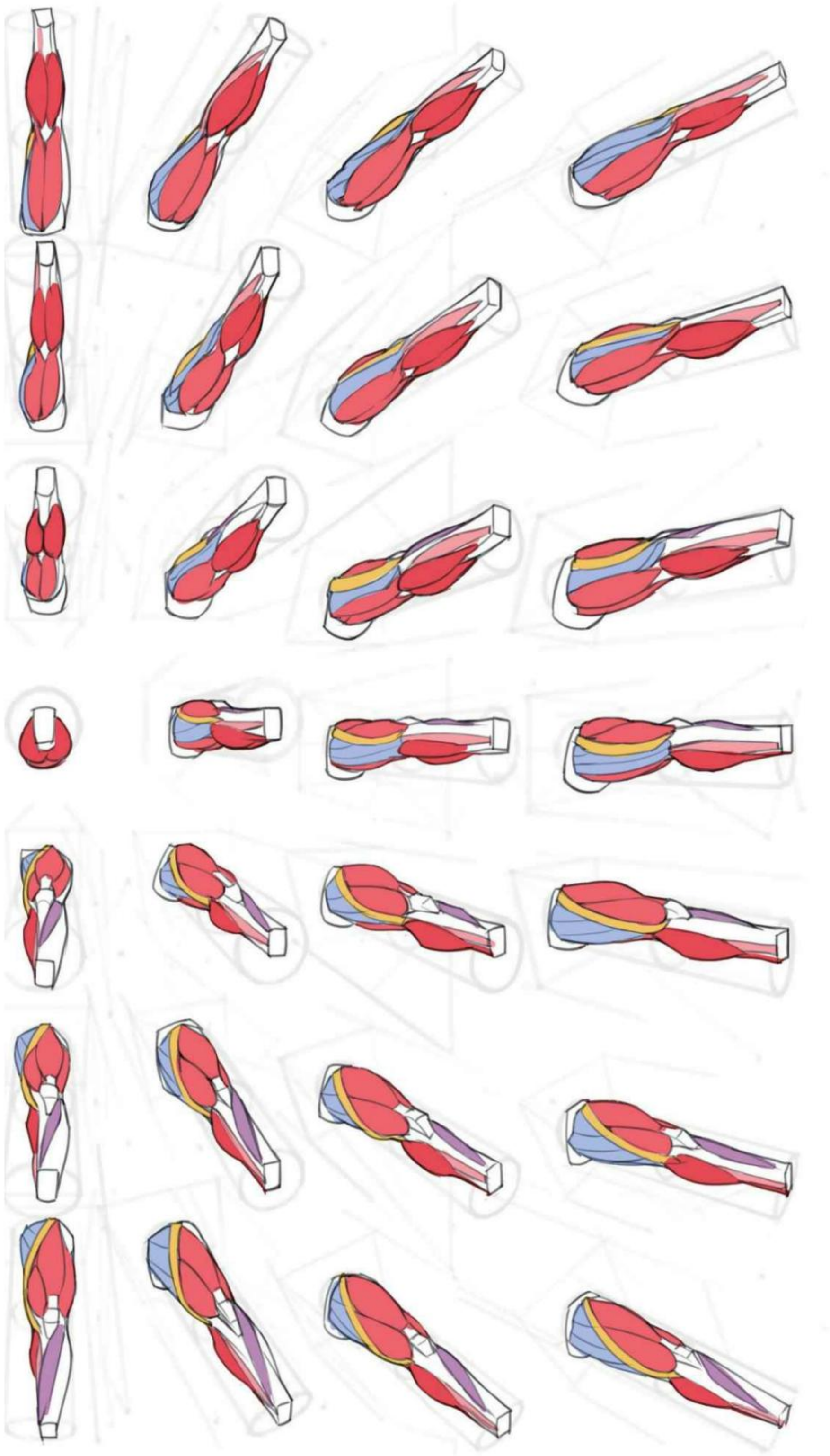
Draw the leg using a cross-section, and deduce its shape in space based on the perspective of the cylinder.

state.

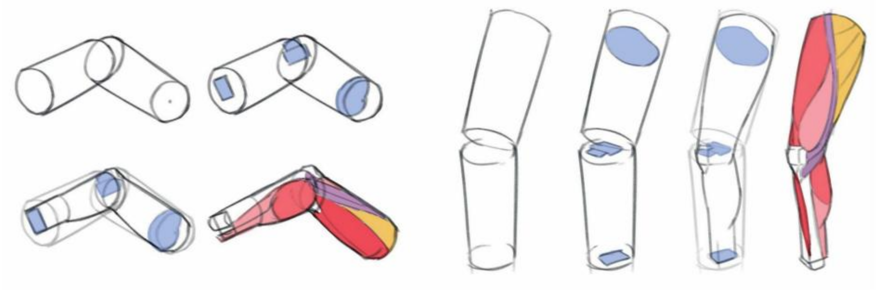


First, draw cylinders at different angles, then use cross-sections to determine the key positions of the leg structure.

Place the leg and draw its outline based on the leg muscles.



This method allows you to quickly master simplified drawing techniques for legs and further analyze leg muscle changes under twisting conditions by understanding muscle structure.



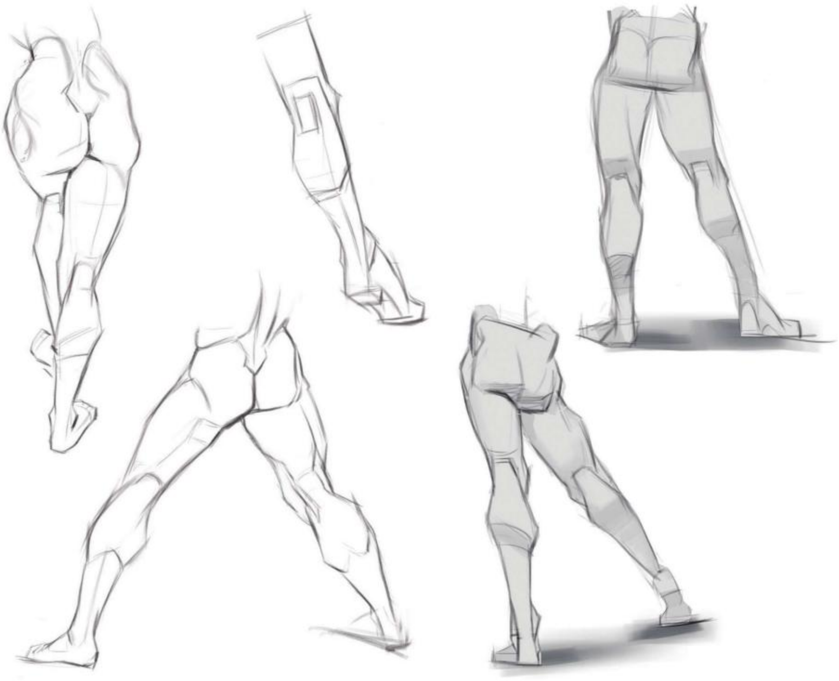
4.4.2 Dynamic performance of the legs

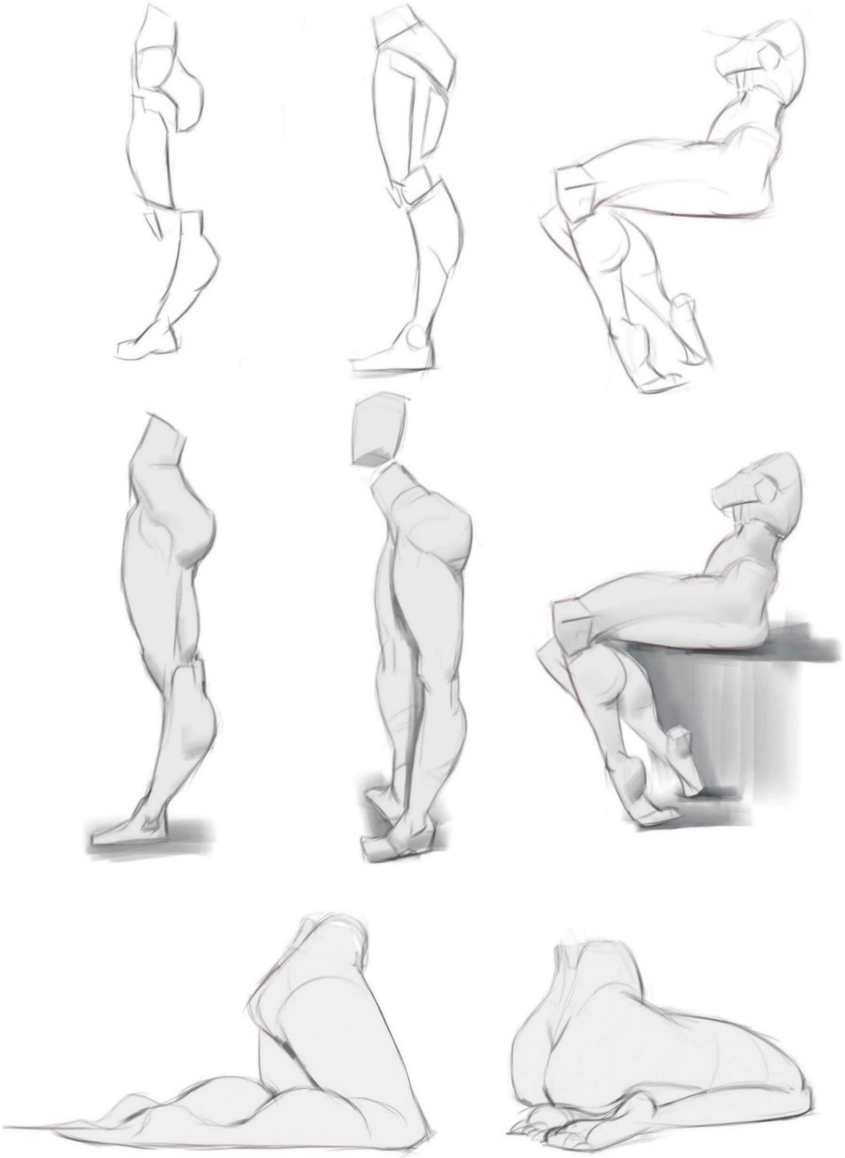
Leg movements are simpler to depict than arm movements; the joints of the thigh and calf can only...

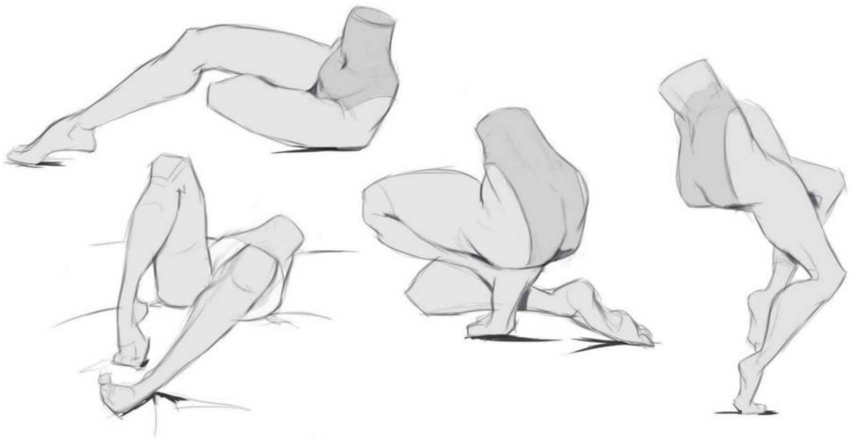
Bend backward, paying attention to the muscle contraction during the bend.

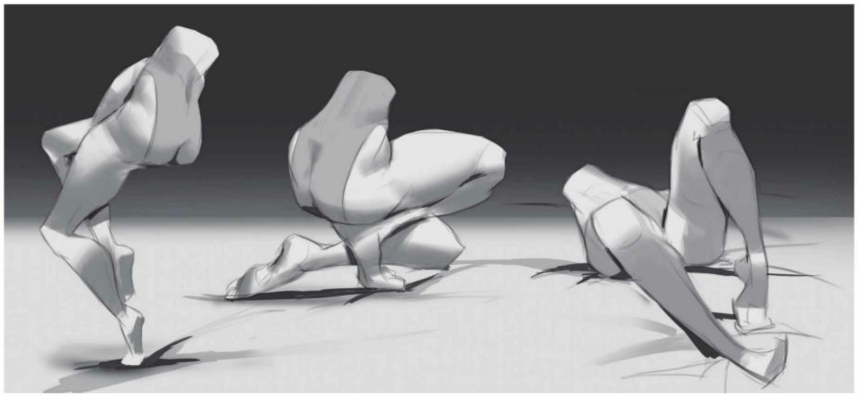
Expressing leg movement focuses more on the relationship between the legs and hips. When a person is standing...

At this time, the leg supporting the center of gravity will lift the hip.



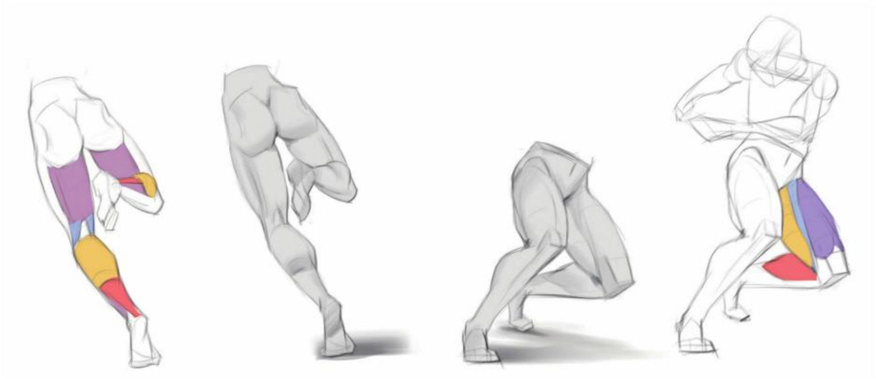






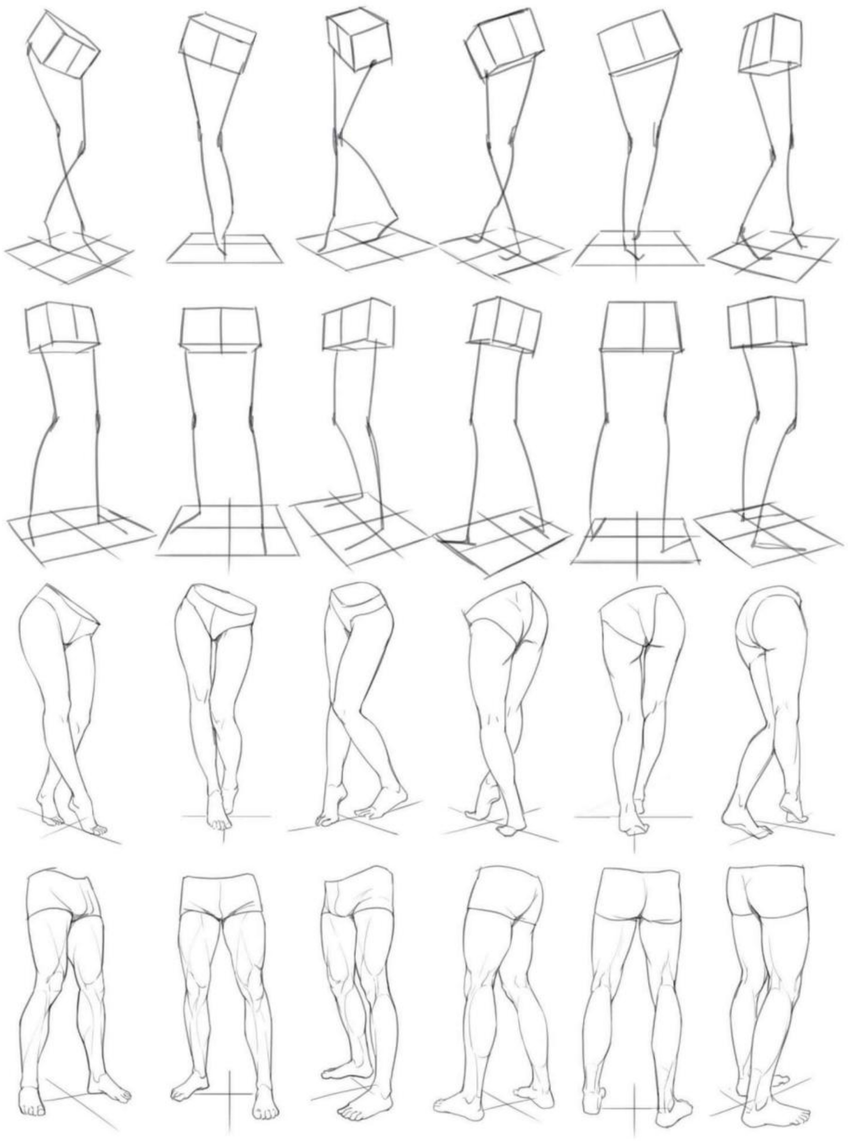
When depicting the posture of leg exertion, pay attention to the direction of the center of gravity shift and the direction of leg movement.

Towards.

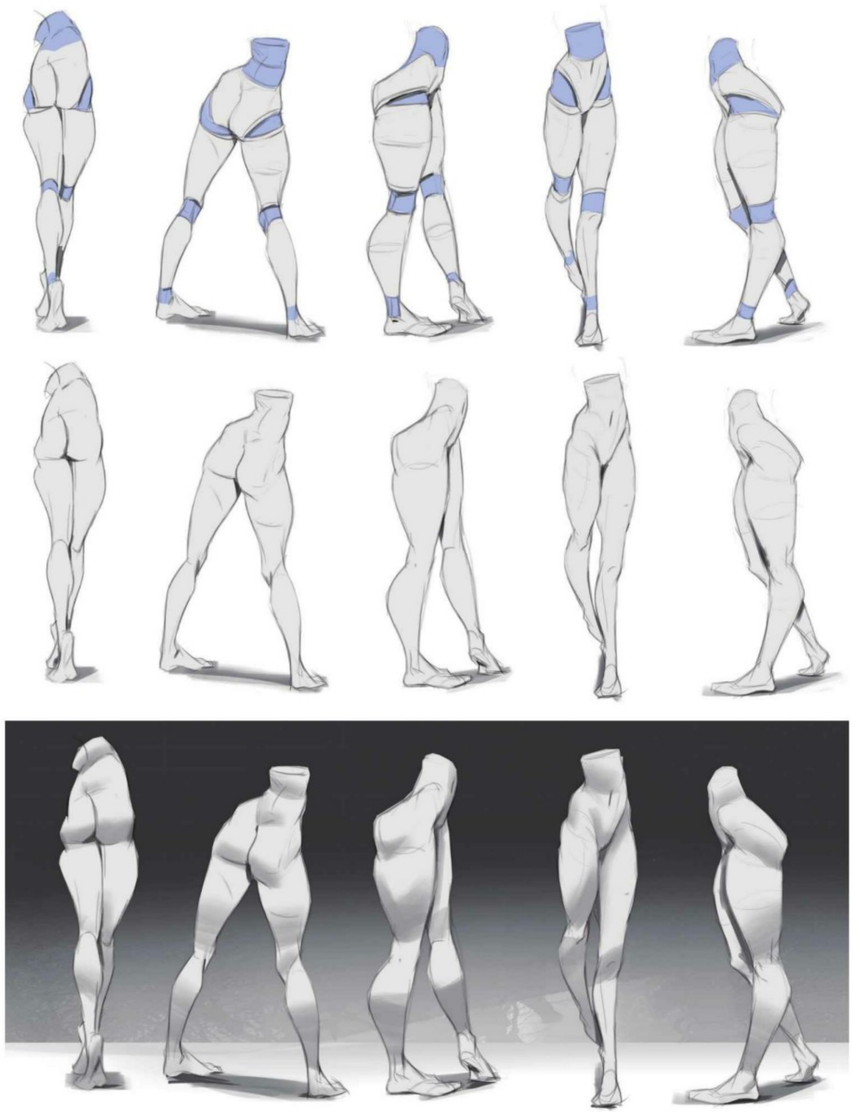


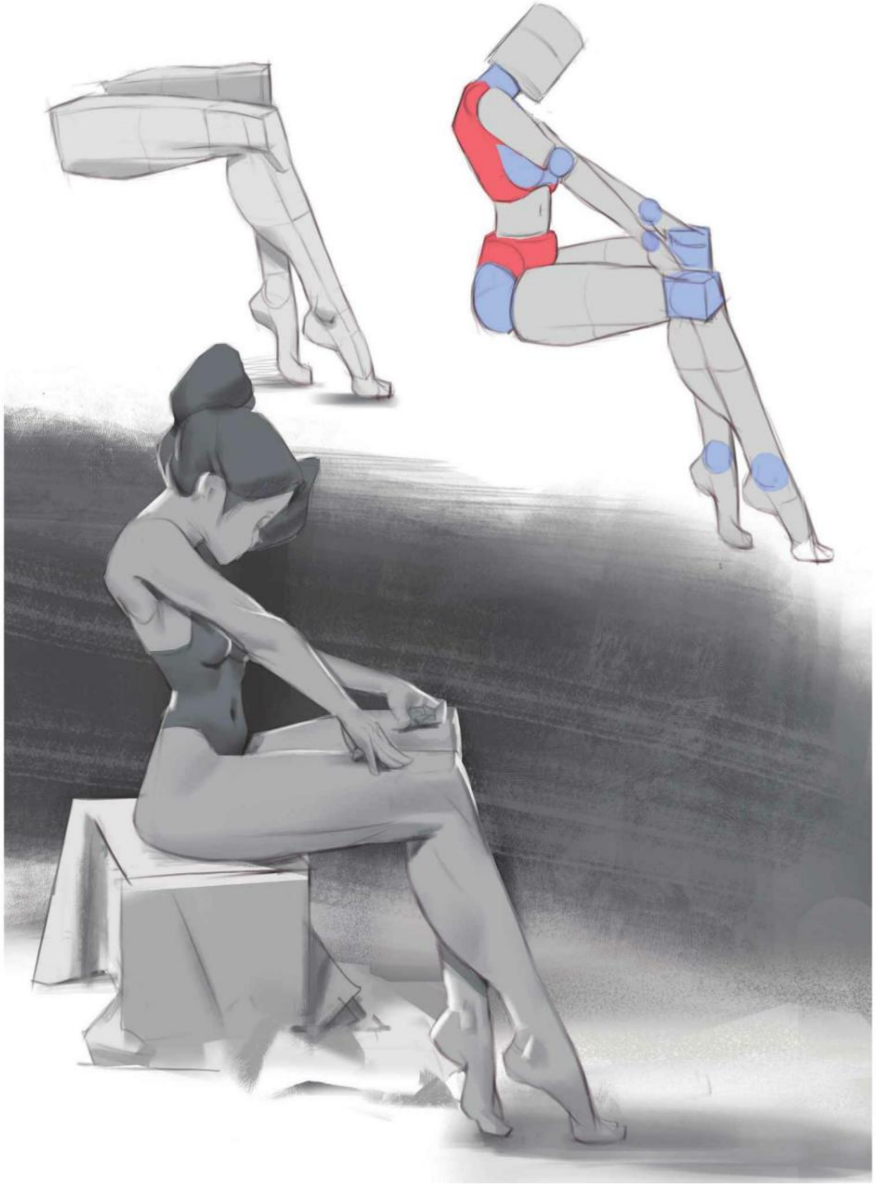
More specialized training

Perform a set of leg exercises for both men and women that involve twisting.

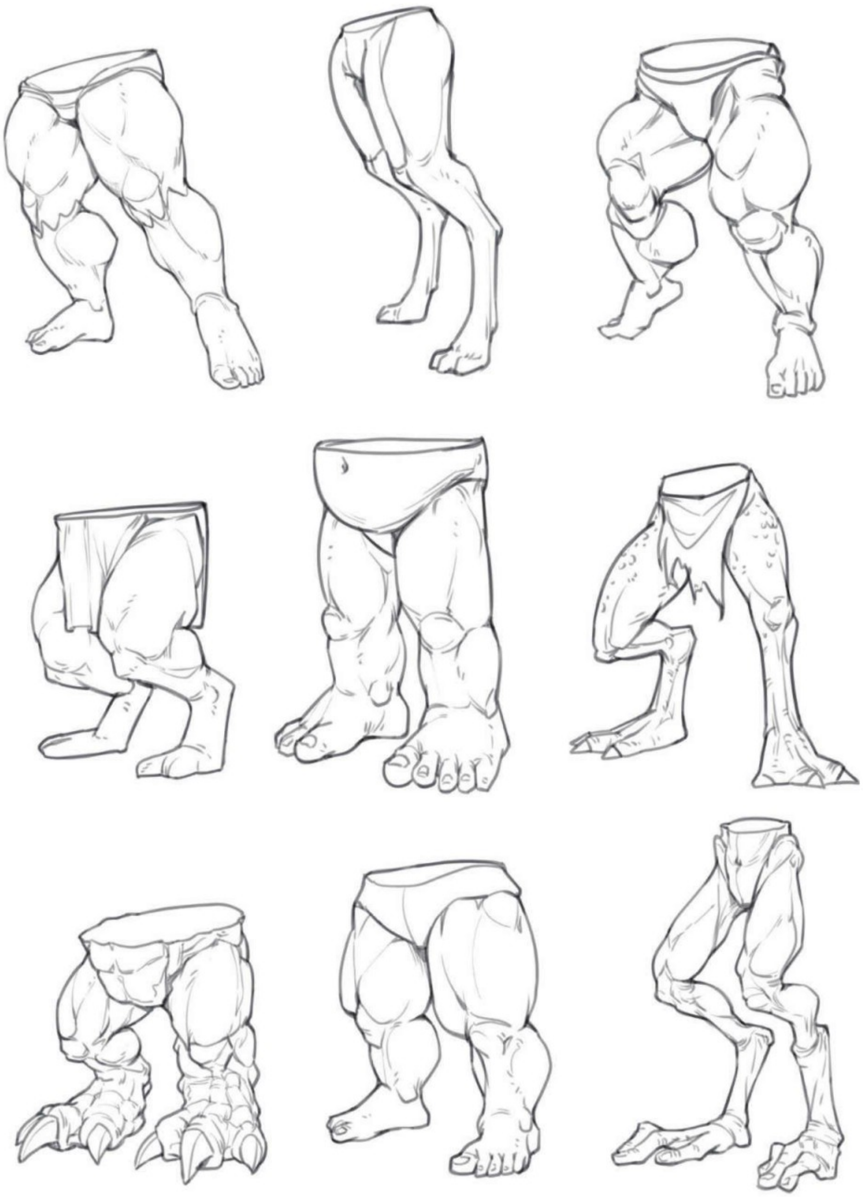


Perform a set of leg exercises in a standing position.





Perform a set of leg exercises in a standing position with exaggerated and deformed poses.



Chapter 5 Hand-Specific Training

hand The human figure is one of the most difficult parts of figure drawing, and beginners often lack sufficient understanding of the structure and form of the human face. When people have a good understanding of hand features, they often draw them very "flat," lacking a sense of three-dimensionality. This chapter will focus on guiding you to understand the structural blocks of the hand, starting with proportions and structure, analyzing the influence of bones and muscles on the hand's outline, and finally delving into the rules of connection and torsion in the hand.

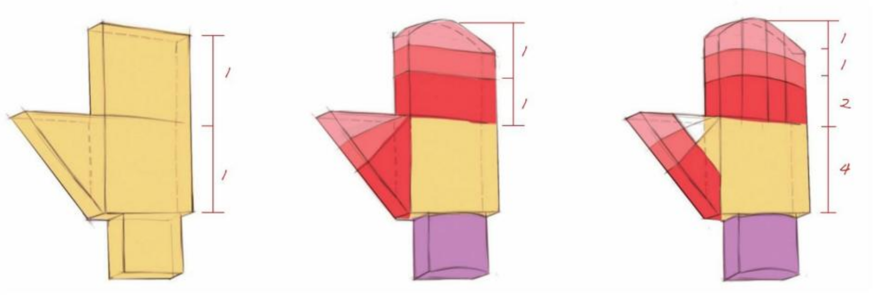
5.1 Proportional Structure of the Hand

Before studying the hand, it's essential to clearly understand the proportions of its various parts. Based on these correct proportions...

Refine the structure based on the existing foundation.

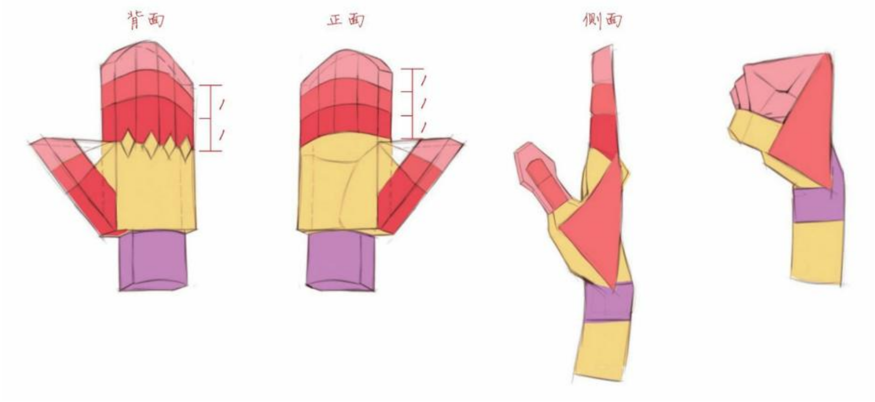
To understand the hand, you can start with the proportions on a two-dimensional plane. The image below shows the proportions of the back of the hand.

system.



The proportions of the palm and the back of the hand are slightly different. The fingers are slightly smaller. When viewed from the side, there is an angle where the

fingers and palm meet. When making a fist, some of the joint structure is exposed after the fingers curl up. Therefore, the back of the hand is slightly longer when making a fist.



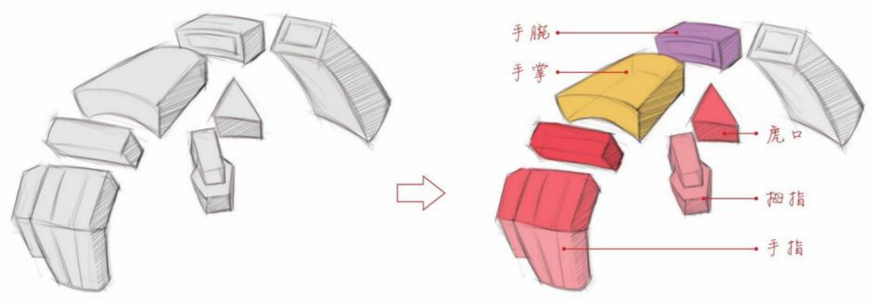
The structure of the hand is relatively complex among human structures, involving five fingers and multiple joints.

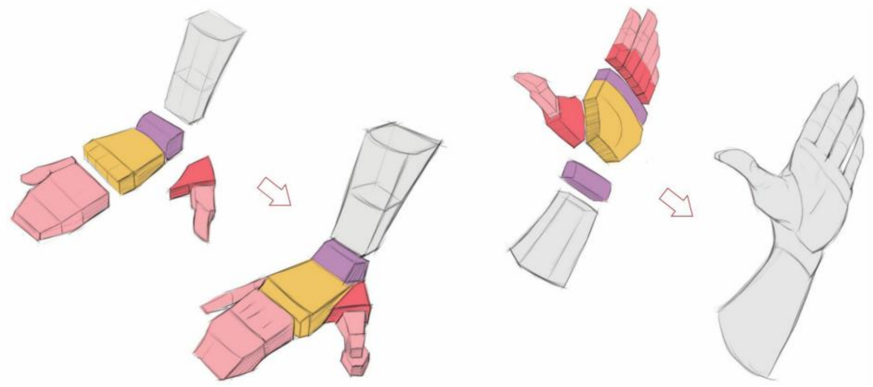
The various movements of the joints are difficult to capture accurately in terms of form. The intricate, intertwined structures of the fingers further intimidate those who want to

learn hand drawing but lack spatial awareness. When drawing hands, the most important thing is to train spatial ability, expressing various spatial relationships (specifically...).

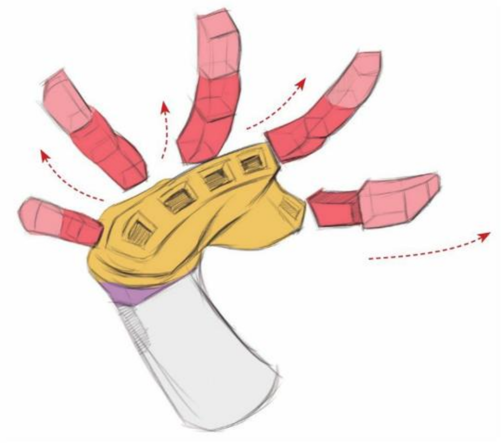
This point is explained in detail in "5.4 Hand Twist and Dynamic Performance".

We can break down the hand into five parts: palm, wrist, web of the thumb, thumb, and fingers.

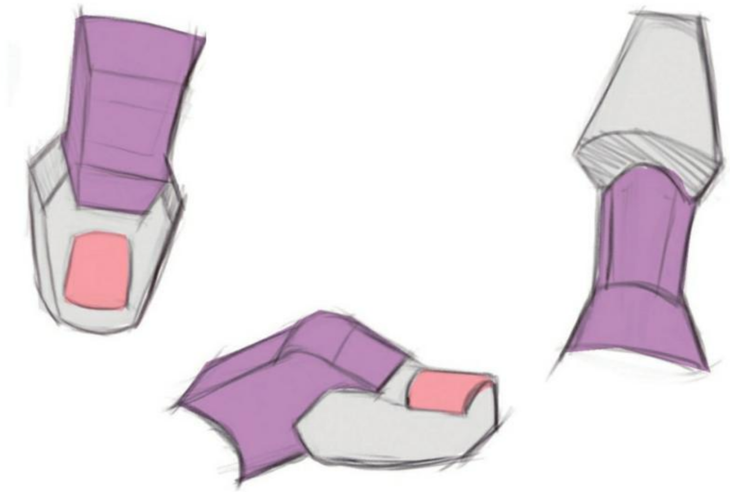




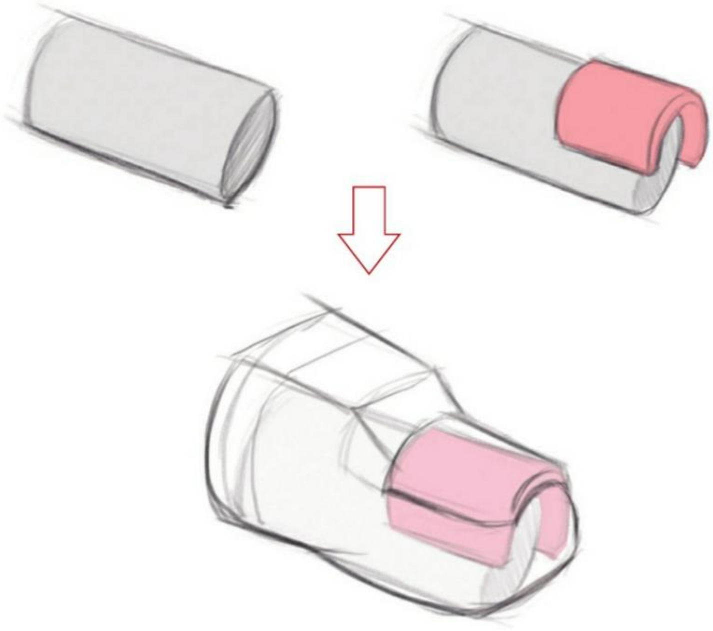
When drawing shapes in spatial perspective, do not be limited by some vague outlines. Only by finding the spatial geometric relationships of the shape can you handle complex structures and spatial relationships with ease while accurately grasping the overall form.



The structure of the thumb in the hand can be summarized as follows.



Fingernails grow on the fingers and change shape according to the curvature of the fingers.



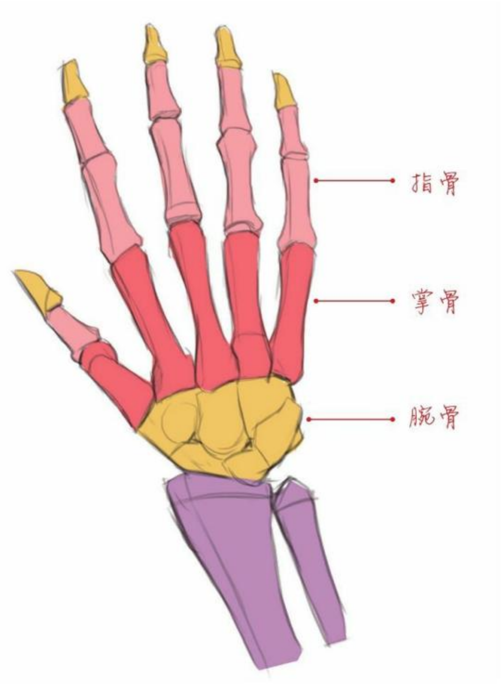
5.2 The Influence of Hand Bones and Muscles on Body Surface Appearance

This section explains the influence of hand bones and muscles on hand surface performance, which should be emphasized during practice.

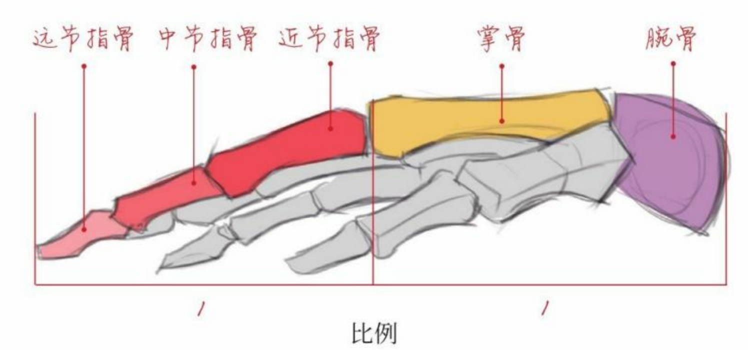
Remember the key bone points and the effects of stretching important muscles on the hands.

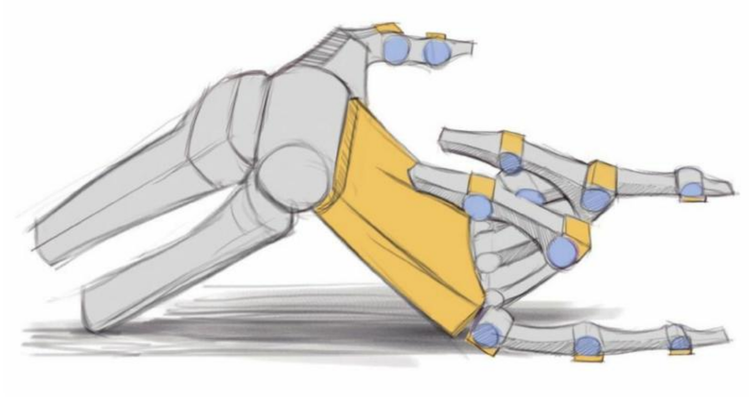
5.2.1 The Influence of Hand Bones on Body Surface Appearance

The bones of the hand are roughly divided into three parts: phalanges, metacarpals, and carpal bones.

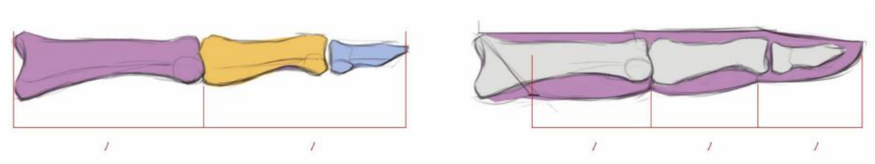


The phalanges are further divided into distal phalanges, middle phalanges, and proximal phalanges.

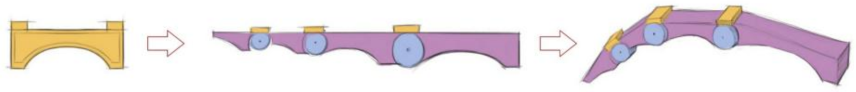


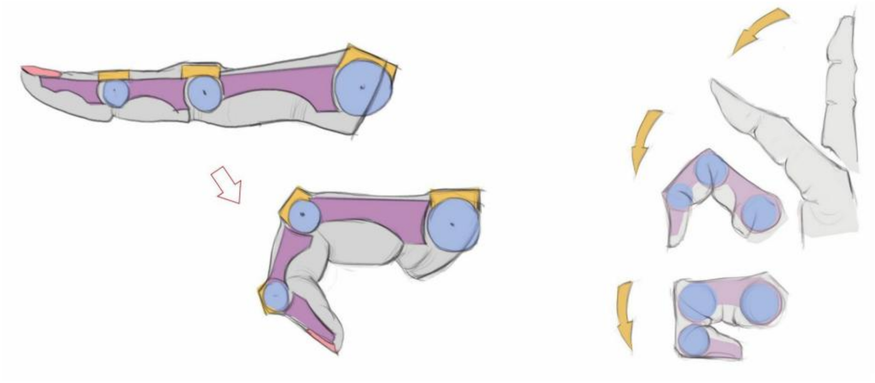


The phalanges have a significant impact on the contours of the hand, especially the finger joints. Viewed from the side, the length of the first finger joint equals the sum of the lengths of the second and third finger joints. The joints of the fingertips are proportionally divided into three equal parts.

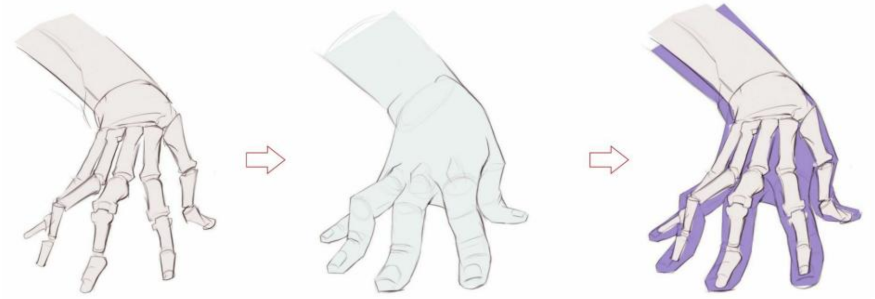


When depicting the bent state of the fingers, you can think of the joints between the fingers as a bridge. The blue structure, composed of the yellow piers and the purple bridge deck, allows your fingers to bend freely.



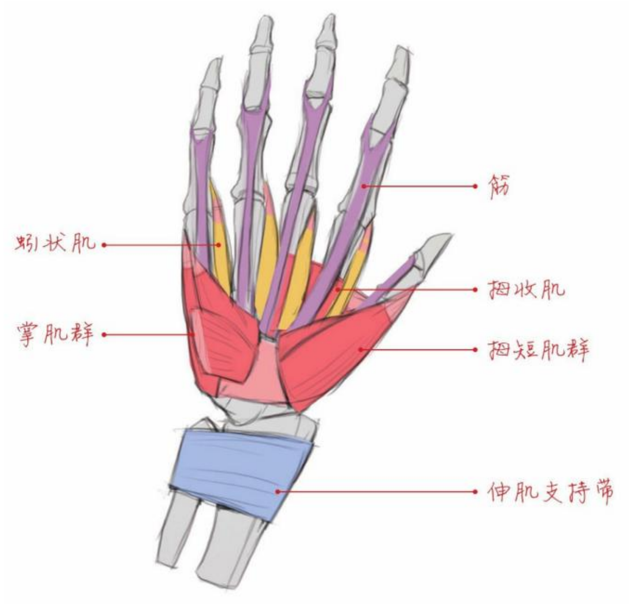


The correspondence between the hand bones and the hand contour is as follows.

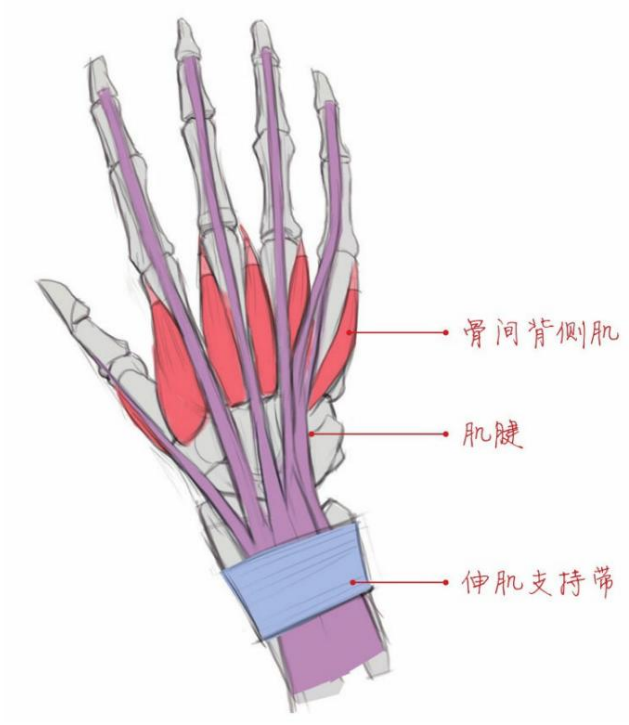


5.2.2 Influence of hand muscles on body surface appearance

The area of the hand contour affected by muscles is concentrated in the palm and near the thumb. As can be seen from the image below, hand muscles have a significant impact on the palm contour, forming two relatively thick pads of flesh around the palm and thumb. The muscles on the back of the hand are concentrated in the gaps, giving the back of the hand a certain curvature.


筋
蚓状肌
拇收肌
掌肌群
拇短肌群
伸肌支持带

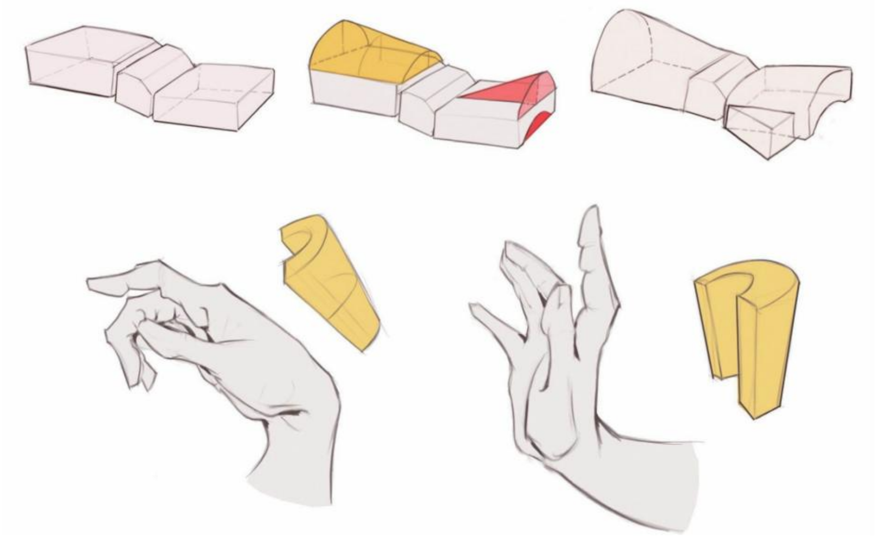
palm


骨间背侧肌
肌腱
伸肌支持带

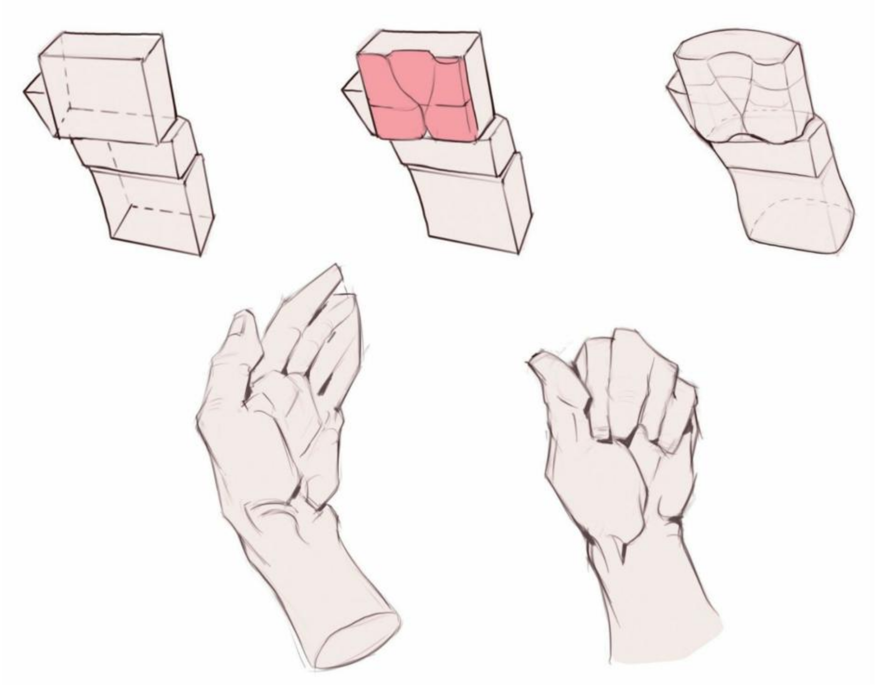
back of hand

Using block structures to represent the muscle shape features in the above diagram makes the drawn hand shape more vivid.

It has a more fleshy feel and looks more realistic, such as the curved surface of the back of the hand and the shape of the fleshy pad of the palm.



The curved surface of the back of the hand



The pads of the palm

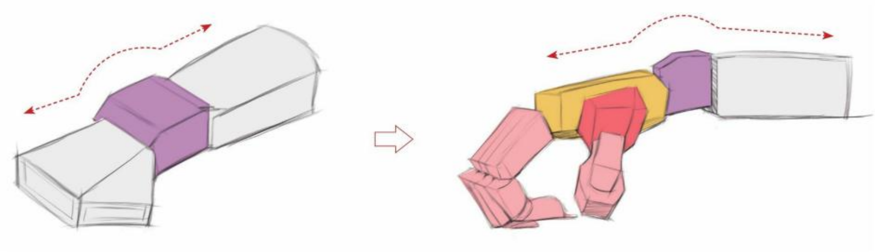
5.3 Connections of the Hand

The connection relationships of the hand are divided into the connection between the hand and the wrist and the connection between the palm and the fingers. These two are often overlooked by beginners. If you don't pay attention when drawing, the hand you draw will not have a wrist, or the connection between the fingers will look very stiff.

5.3.1 Connection between hand and wrist

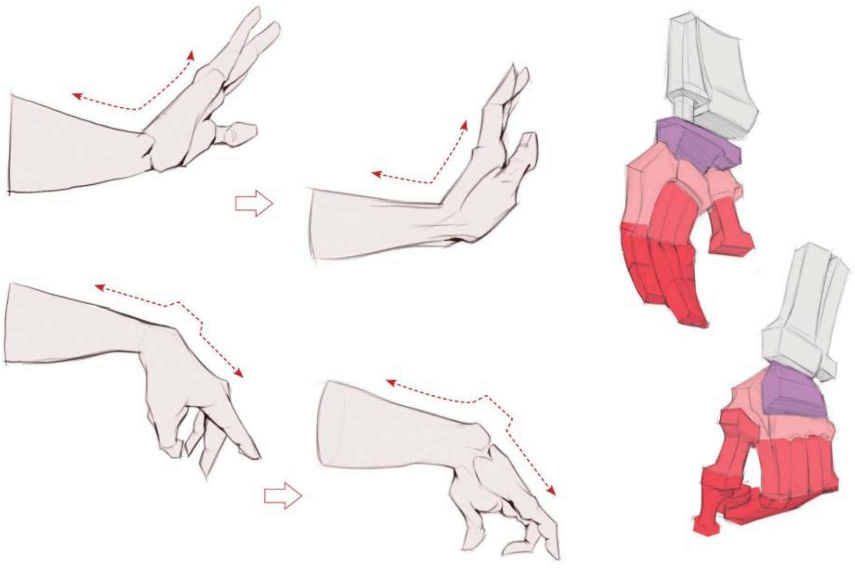
The wrist protrudes from the forearm and palm, creating an apparent height difference between the forearm and palm.

The situation.



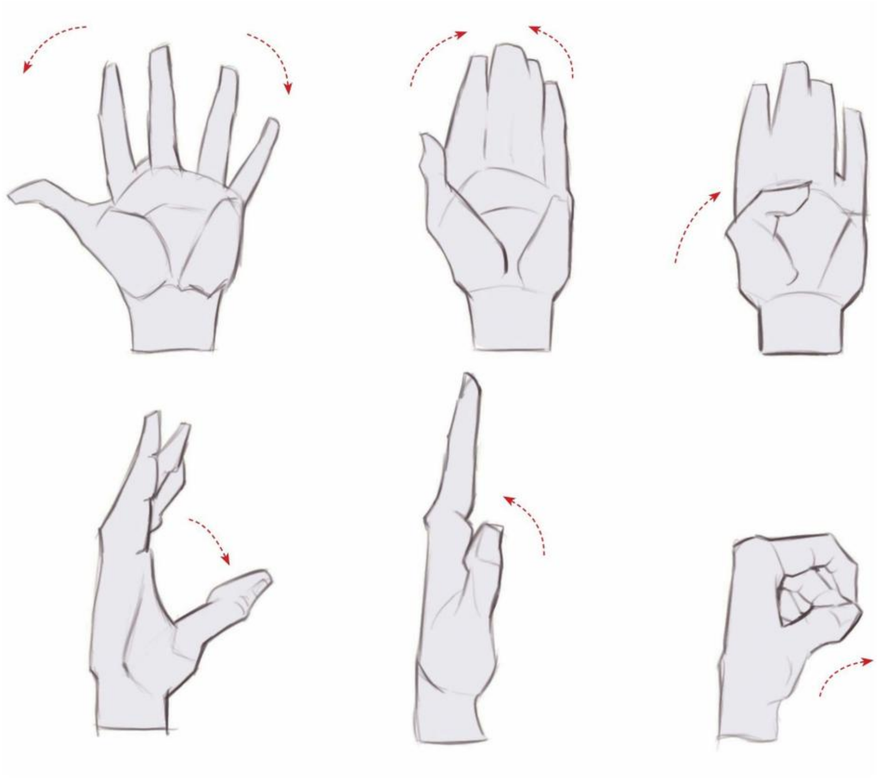
The height difference between the forearm and palm is not noticeable when the hand is raised, but becomes more apparent when the hand is flat and hanging naturally.

This is especially evident at times.



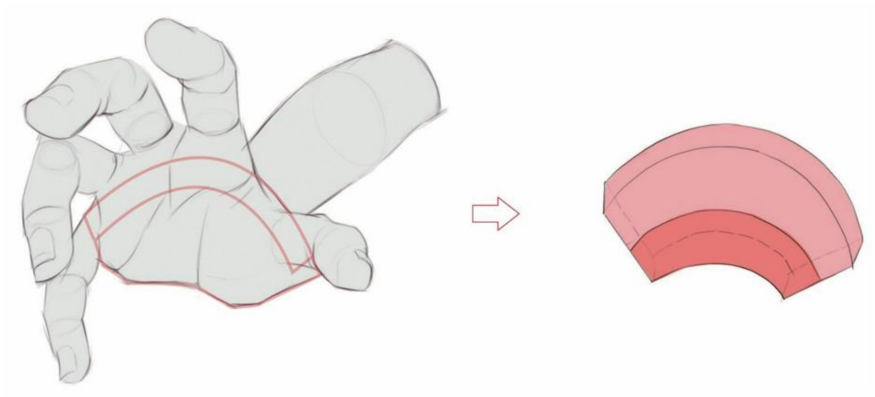
5.3.2 Connection between palm and fingers

The connection between the palm and fingers is relatively simple, but the connection between the thumb and palm is different from the connection between the other fingers. The connection between the thumb and palm is more flexible and has a wider range of motion.



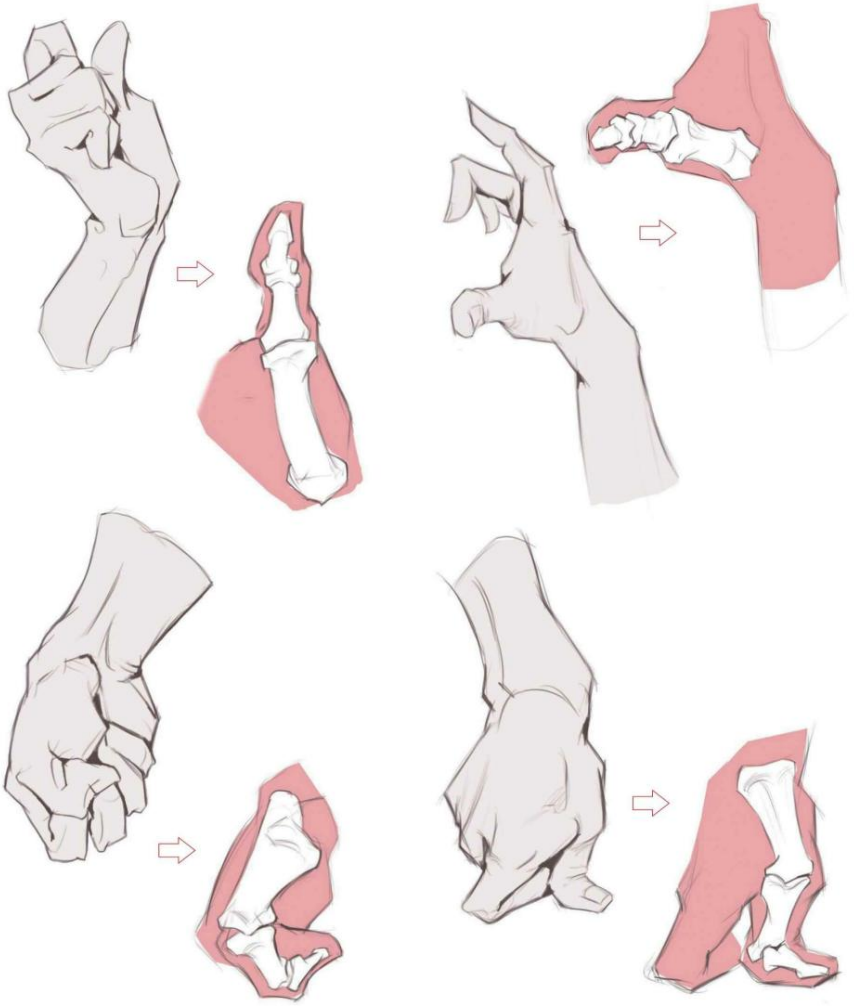
When the thumb bends downwards, it forms a certain arc with the palm. To make the hand shape appear more natural...

To make it move, this curved surface needs to be drawn.



The thumb's joints are more flexible, allowing it to bend backward more easily than the other four fingers.

The shape has a larger curvature.



hint

When depicting fingers, avoid having them side-by-side or pointing in the same direction; instead, use appropriate...

Adjust it slightly to avoid stiffness.

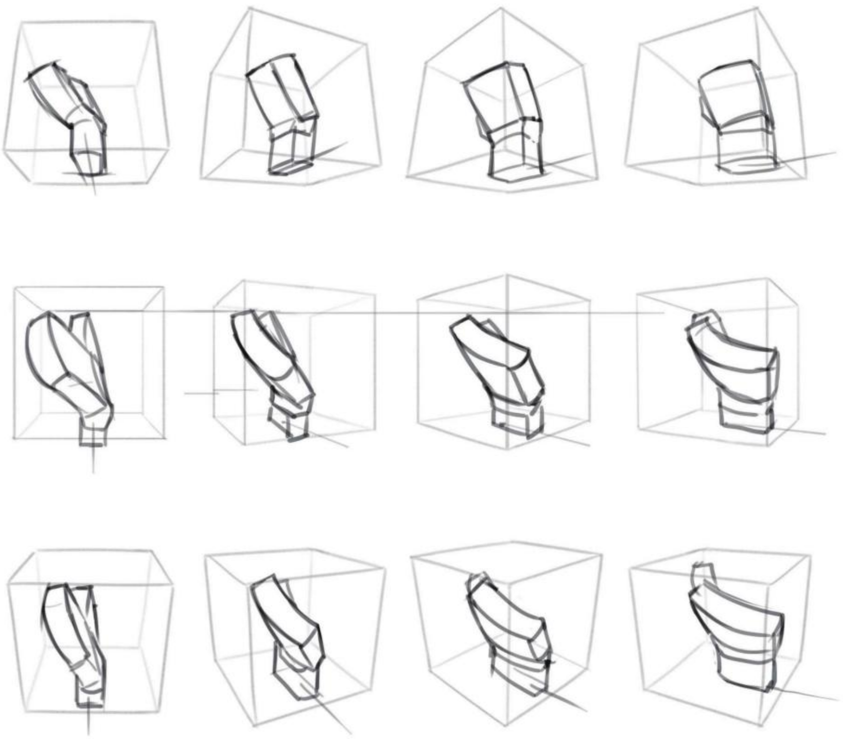
5.4 Hand Twisting and Dynamic Performance

Once you understand the structure of the hand, you can draw the same hand in different angles in different perspective spaces, creating hand shapes with different dynamics.

5.4.1 Hand Twisting Manifestations

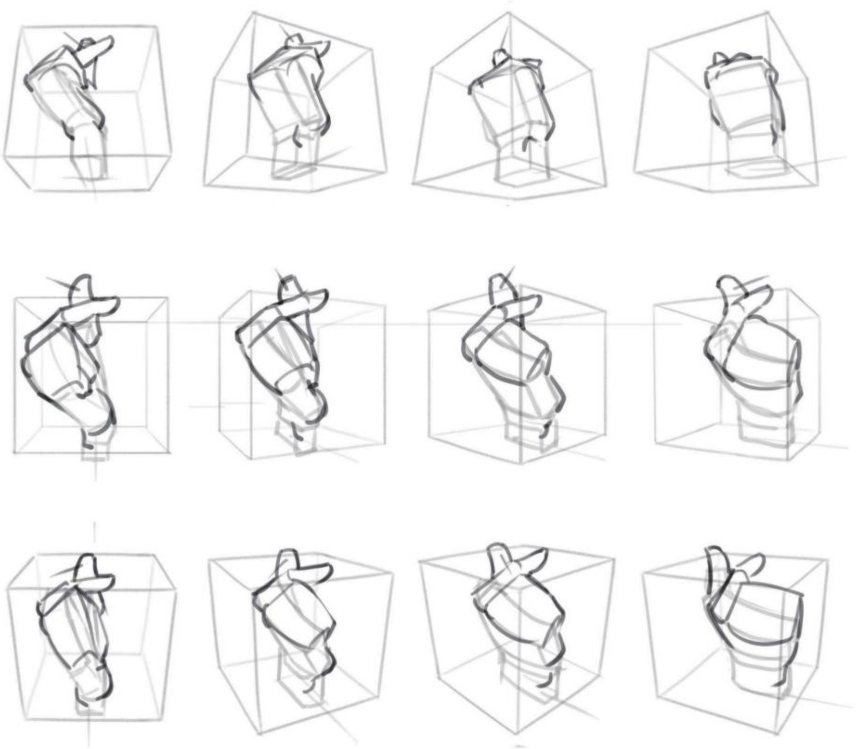
Studying hand twisting is a test of spatial awareness, examining whether one can deduce the shape of a hand from other angles based on a given hand movement. Regular practice with such exercises can enhance spatial awareness.

Use a cube to define the perspective space, and then draw the volumetric relationships between the palm, wrist, and arm from different angles within that perspective space.

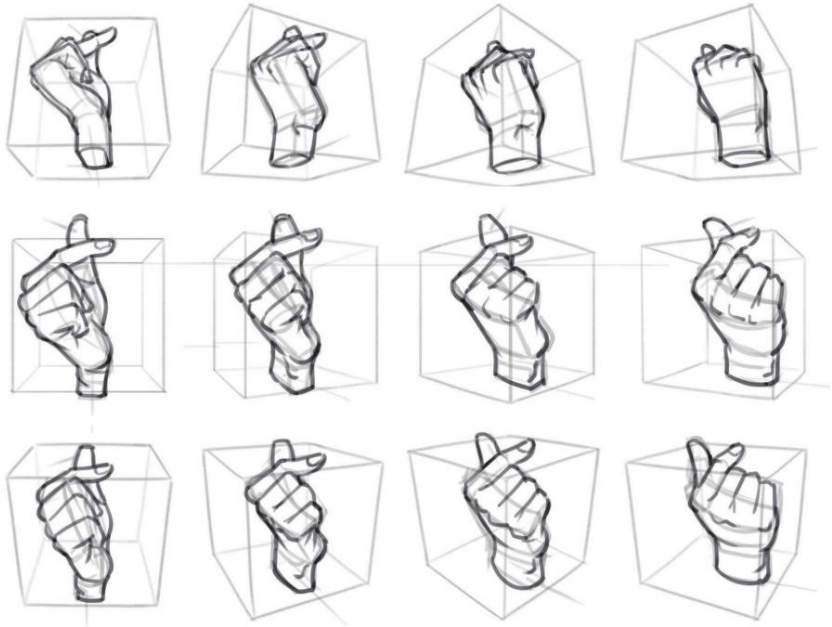


Draw the fingers based on the body shape, dividing the fingers into groups as much as possible; here, the thumb and index finger are separated.

Now, draw the thickness of the muscles in your palm.



Refine the hand structure, paying attention to ensuring that each finger faces a different direction as much as possible.



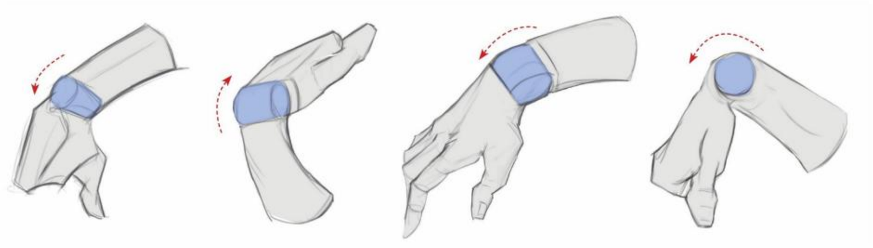
5.4.2 Hand dynamic performance

Studying hand dynamics requires studying the wrist simultaneously, examining whether the connection at the wrist is natural and fluid.

smooth.

The wrist joint is the largest joint in the hand, and its movements affect the hand's movement tendencies.

Momentum.

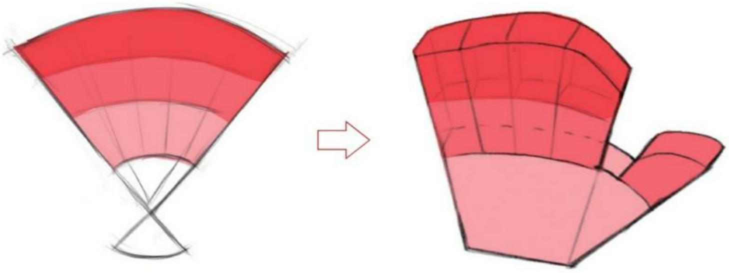


The twisting motion at the junction of the palm and fingers affects the overall outline of the hand. To

draw dynamic hands well, one should observe the changes in shape and form of their own hands during movement.

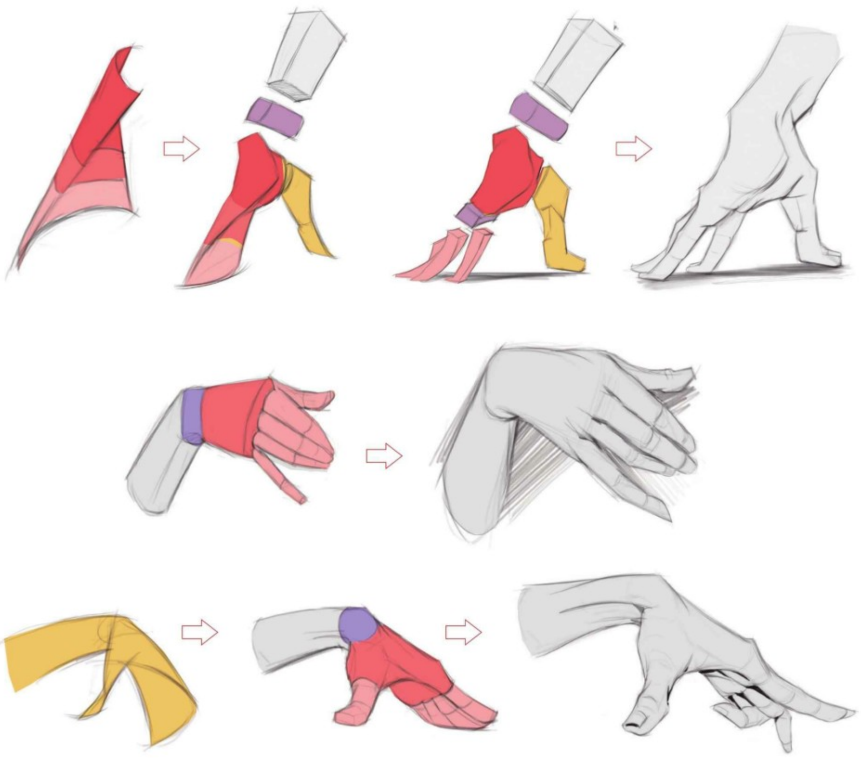
change.

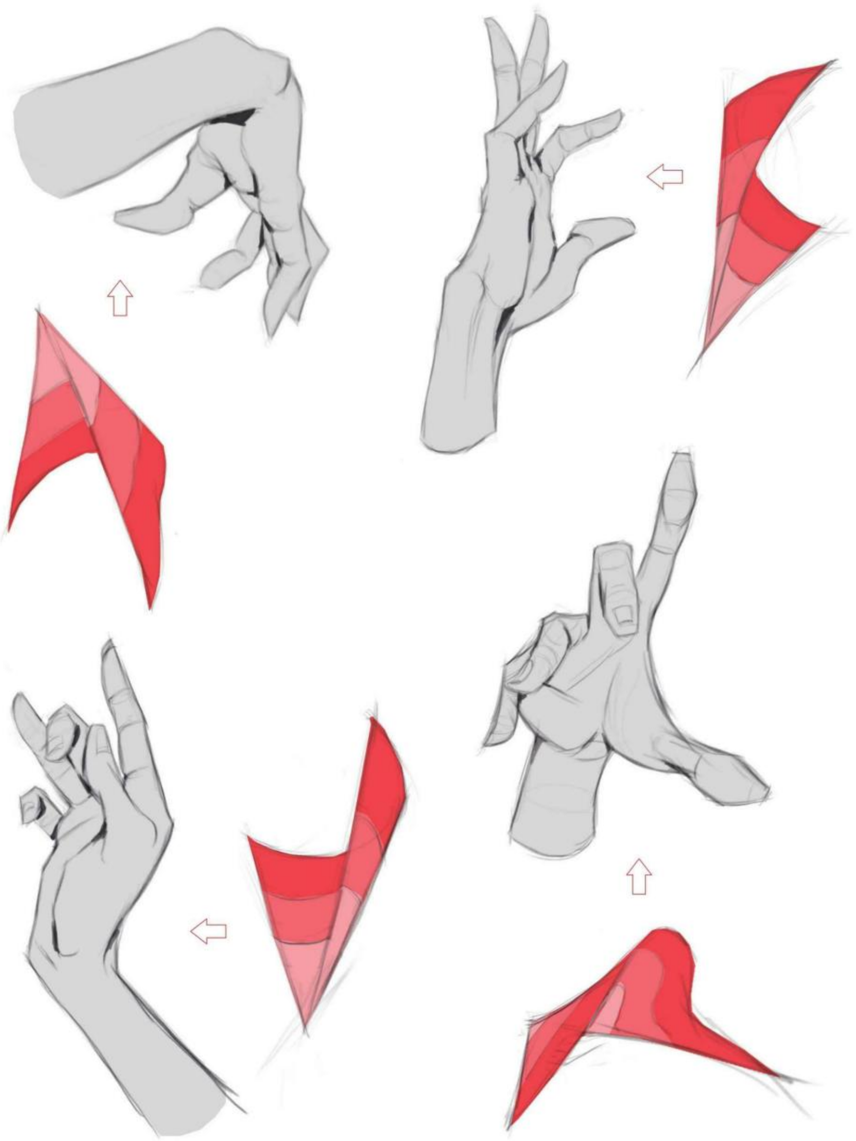
Imagine your five fingers as a fan; a fan can be opened and closed.



When the fingers twist, they create very graceful arcs. This can be used to depict the dynamic movement of the hand.

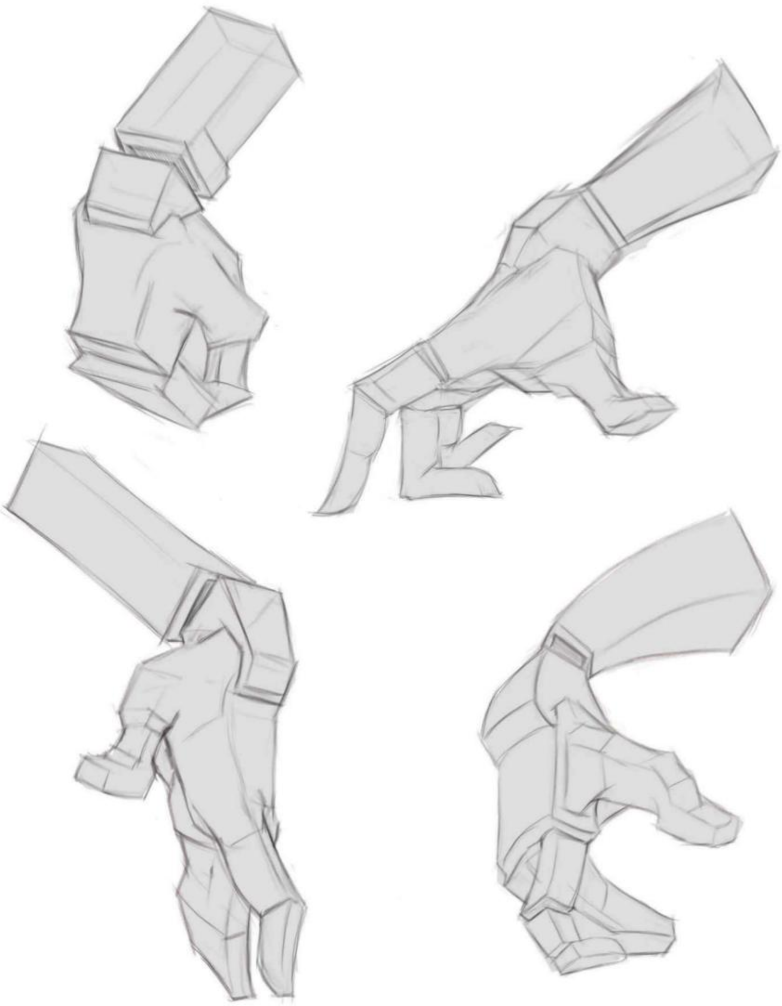
The use of a fan-shaped structure helps to make the drawn hand more dynamic.

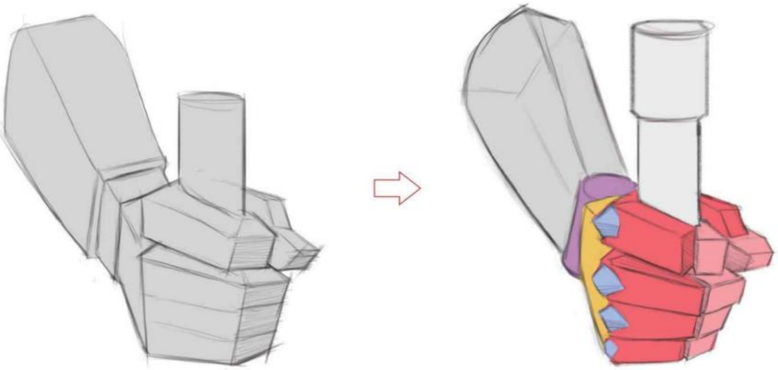




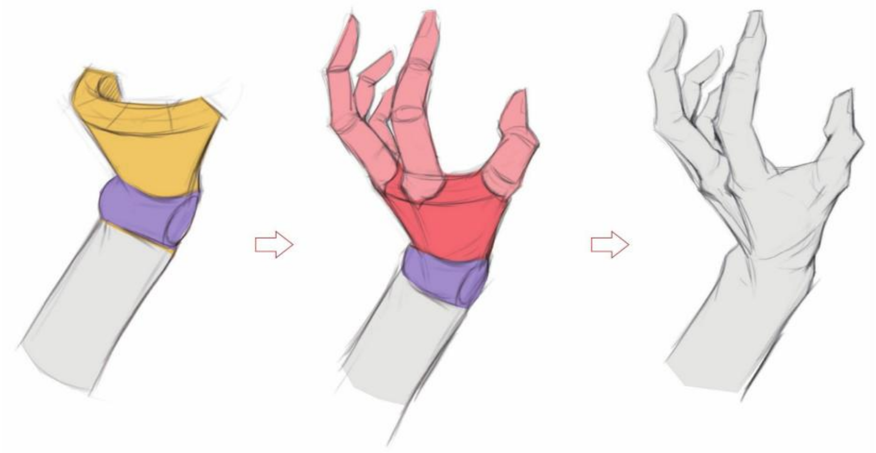
Dividing hand movements into multiple geometric shapes and combining them helps in mastering hand dynamics.

At the same time, it also takes into account the three-dimensionality of the hand.

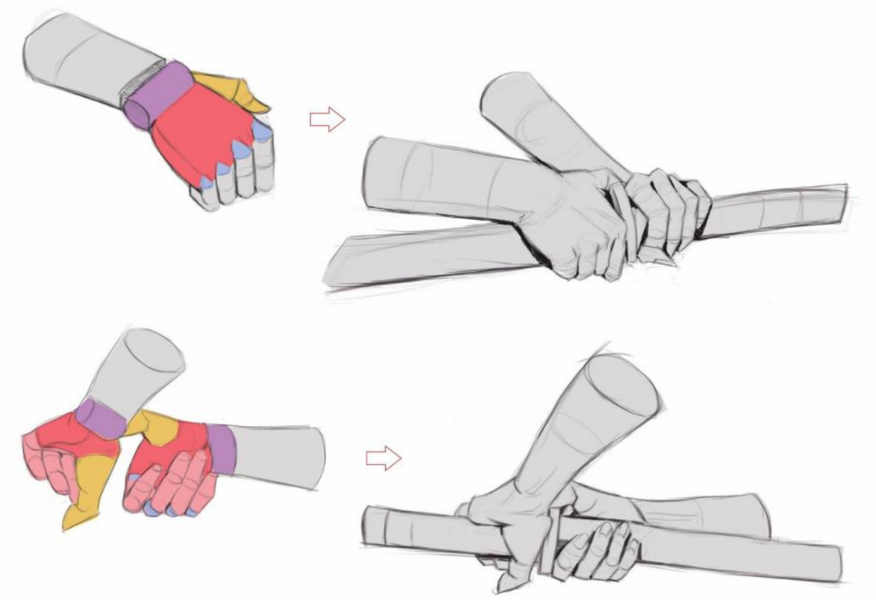


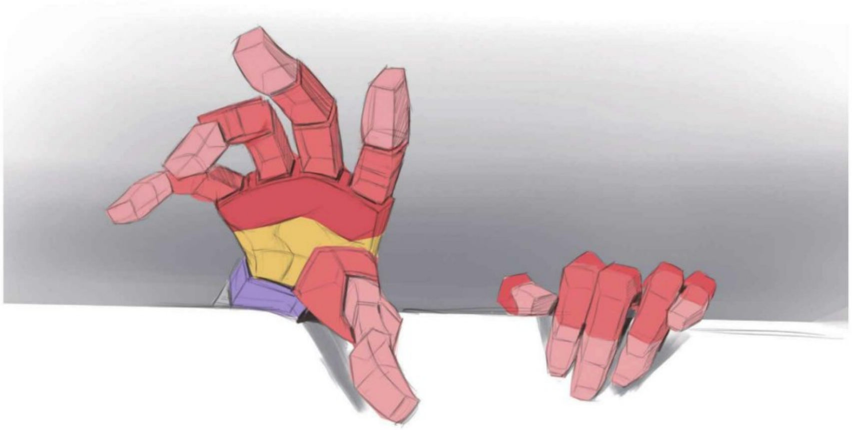


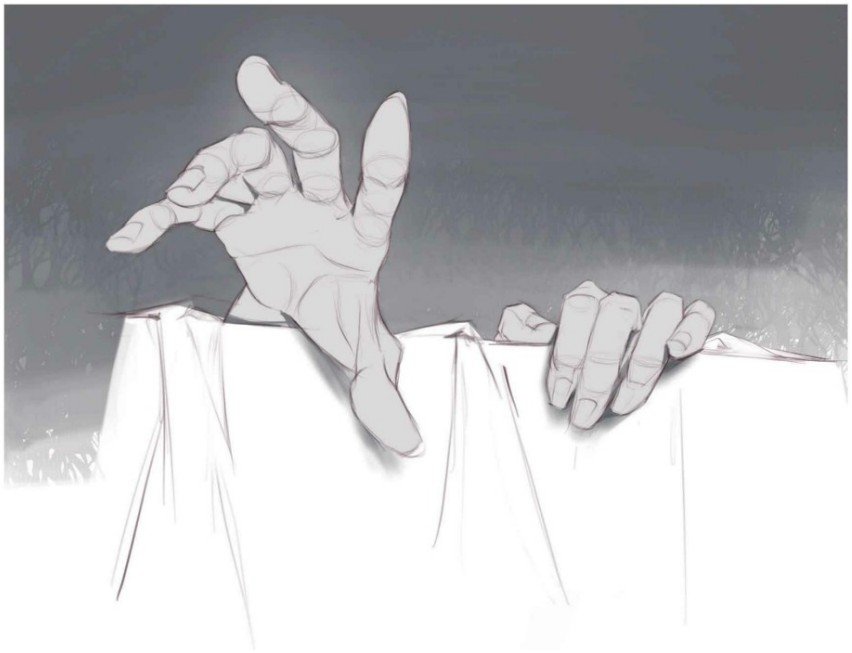
Due to the growth of the finger joints, the palm presents a curved, three-dimensional fan shape.

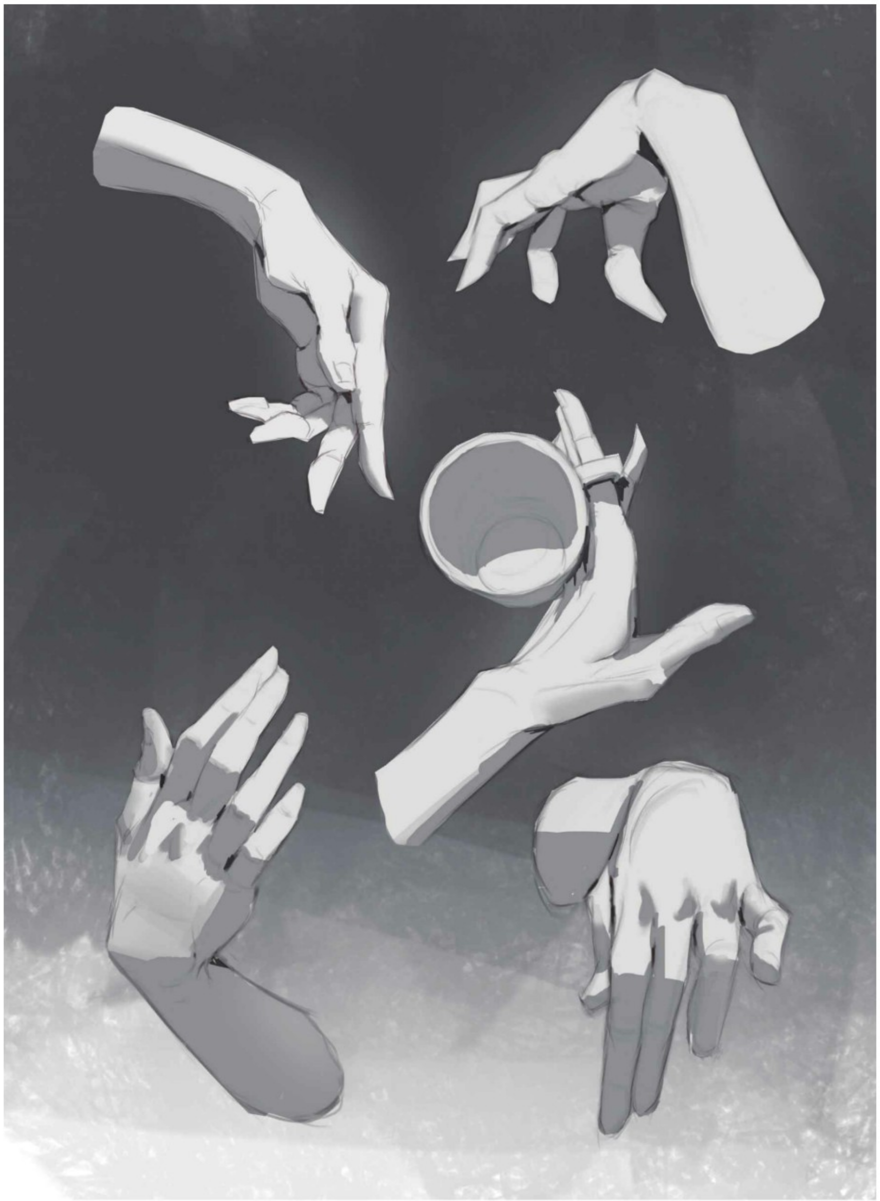


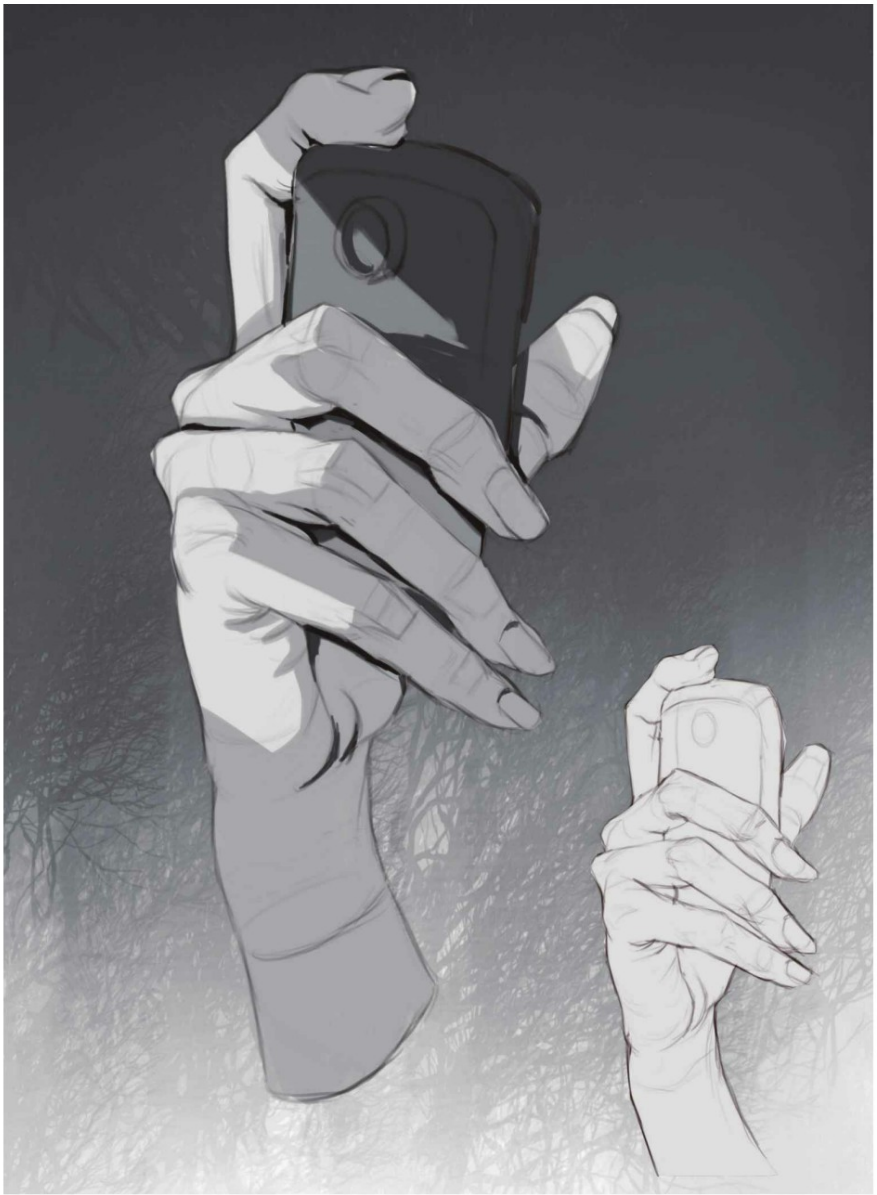
The hand movements are demonstrated below.

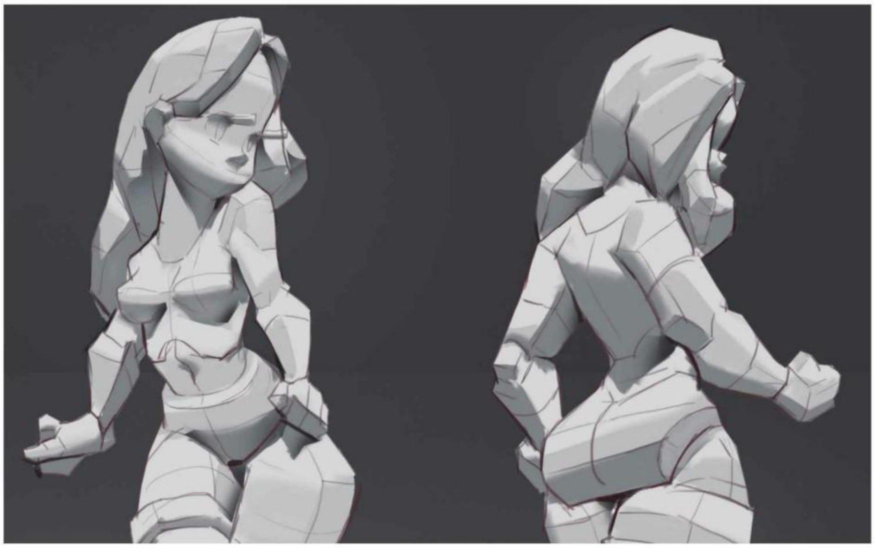


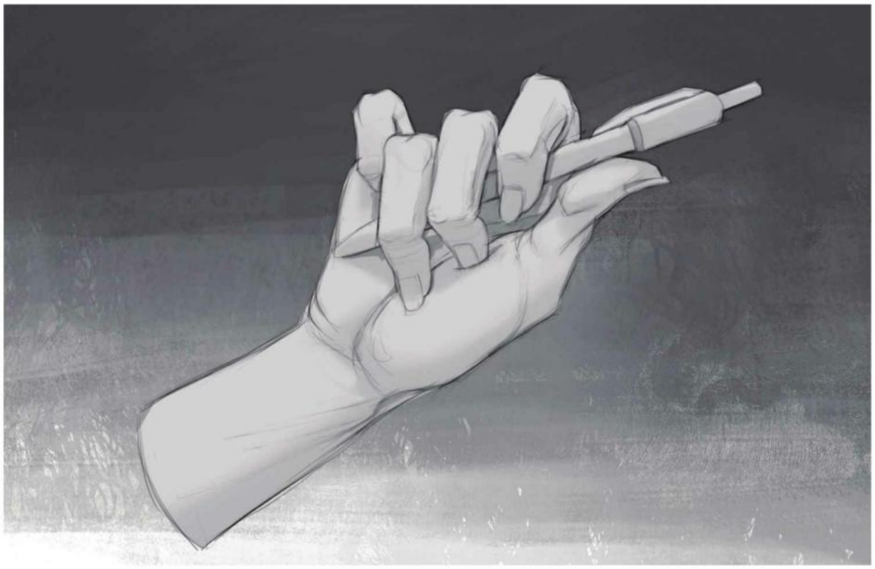






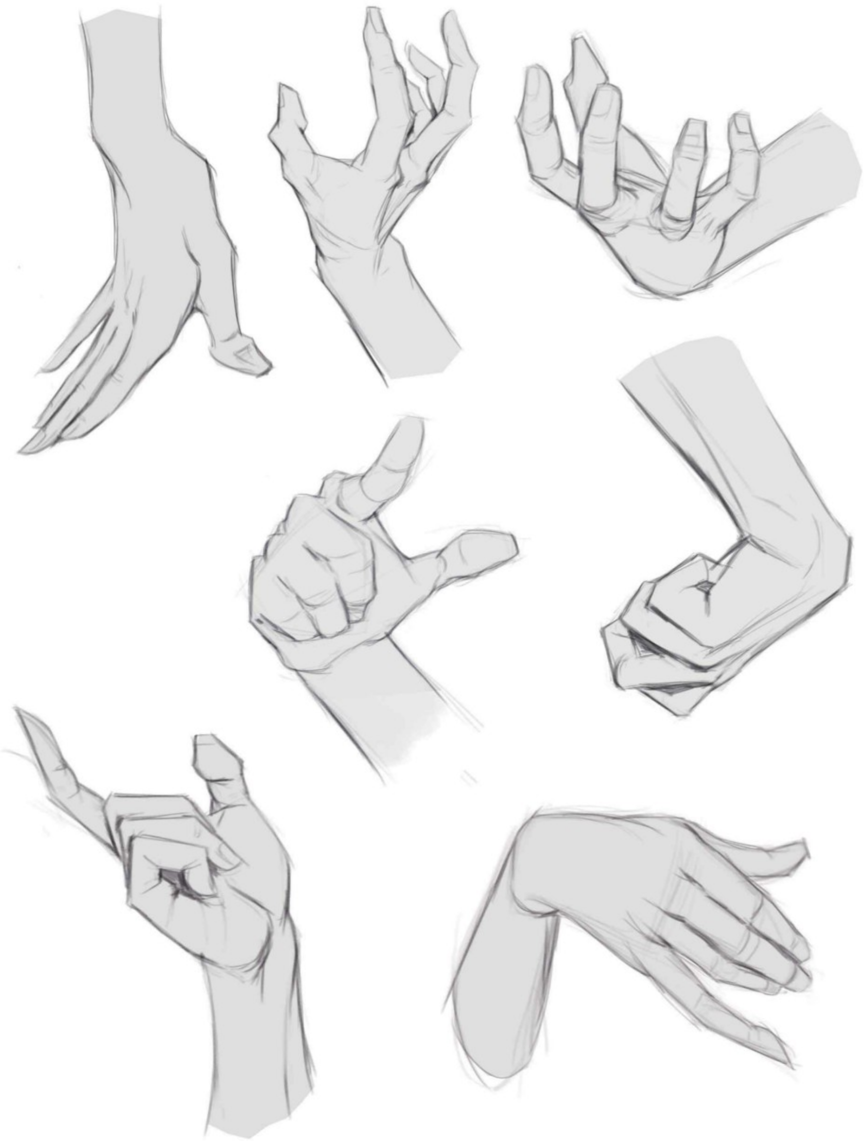






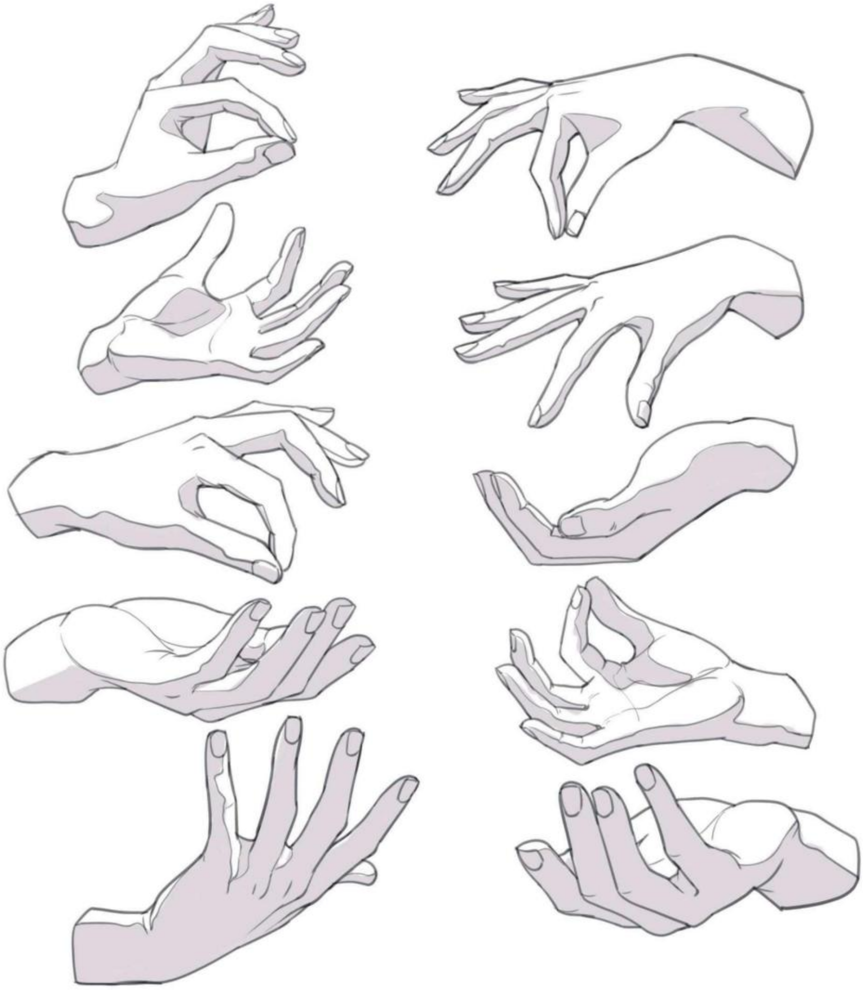
hint

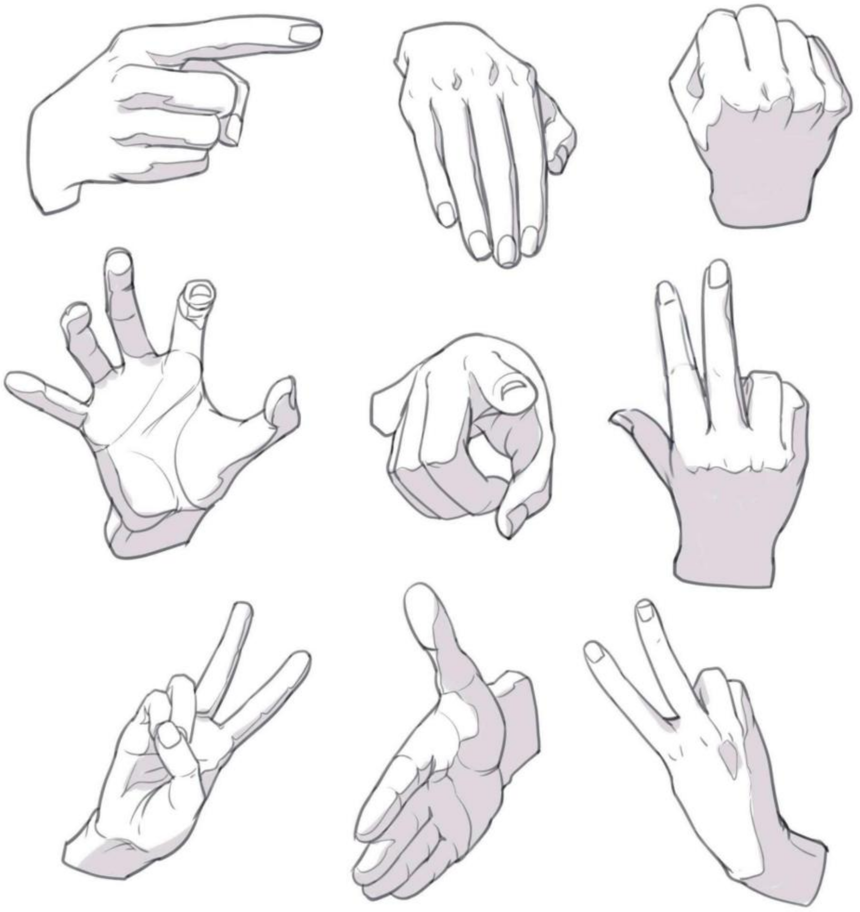
When depicting hands under lighting conditions, the overall light and shadow should be represented, and the shadows should be consistent. Avoid making the shadows appear "blurred" or focusing only on the light and shadow of a single finger.



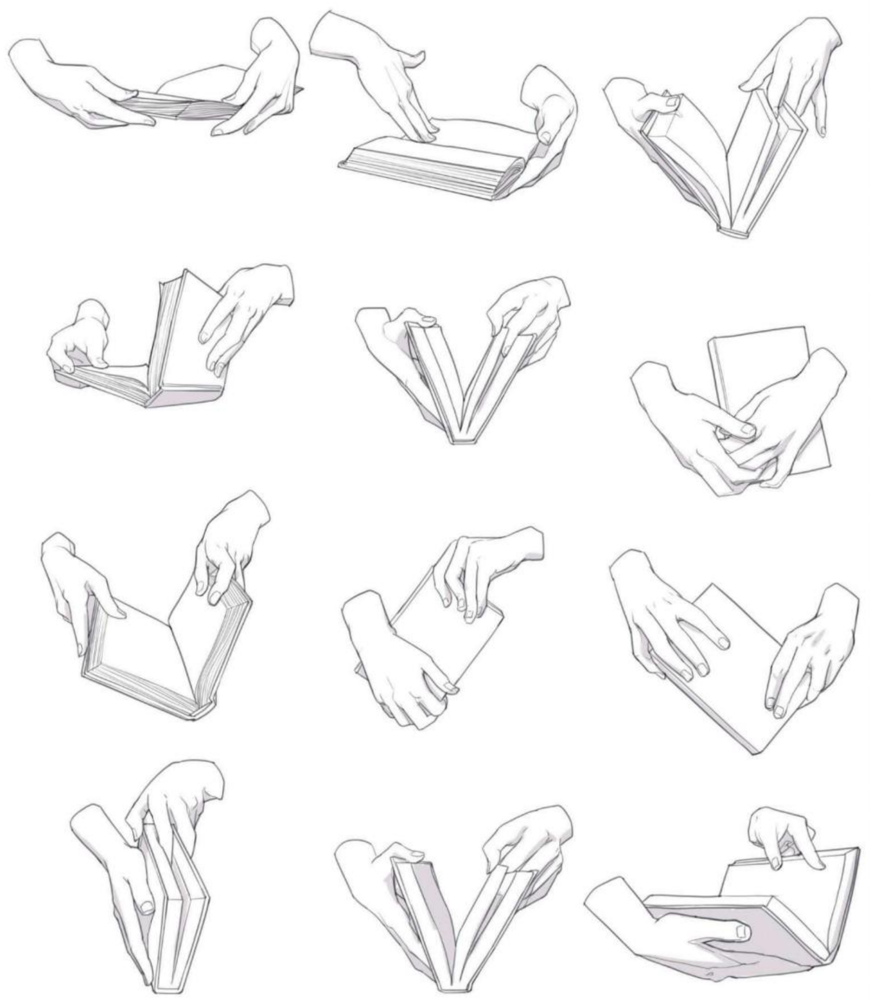
More specialized training

Practice a set of common hand gestures.

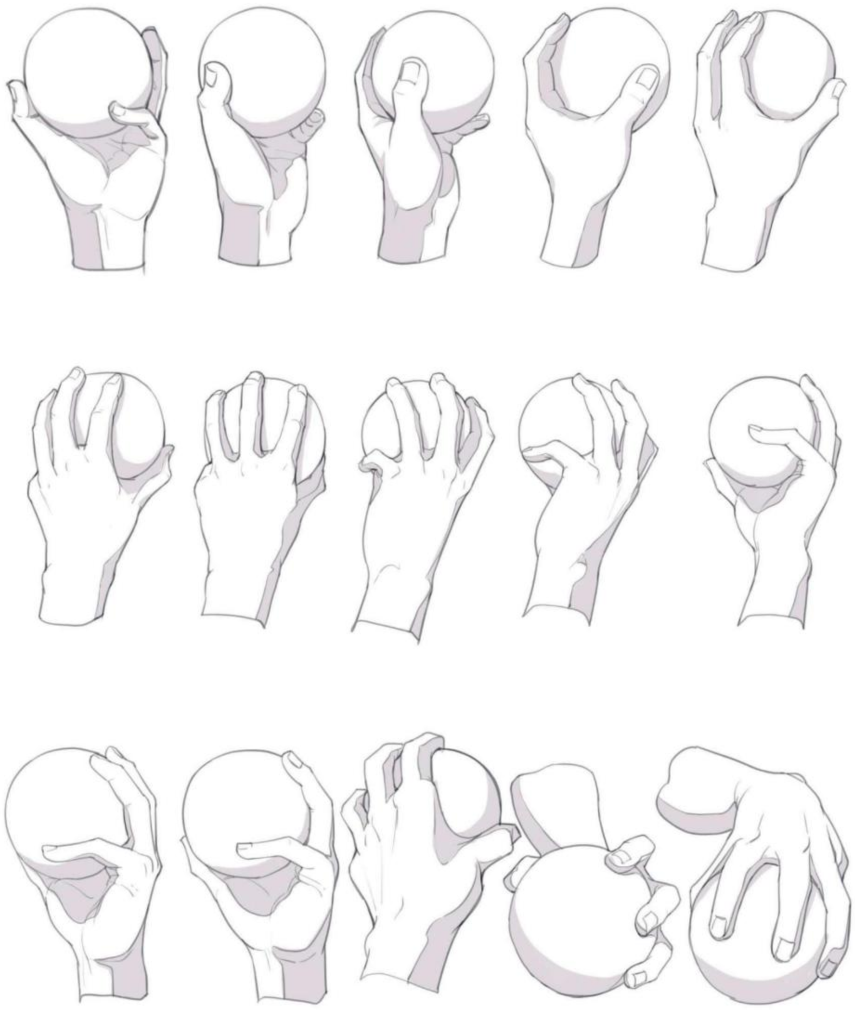




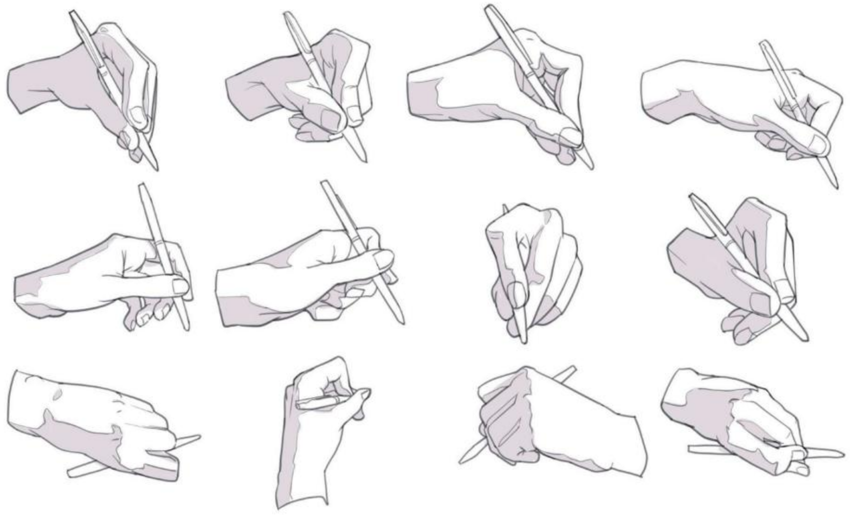
Do a set of exercises involving turning pages with your hands.



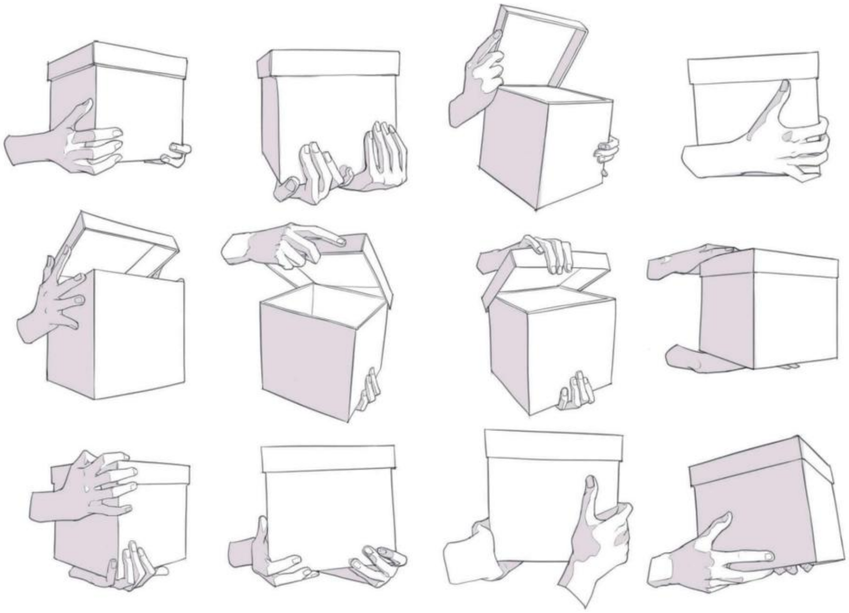
Do a set of ball-gripping exercises.



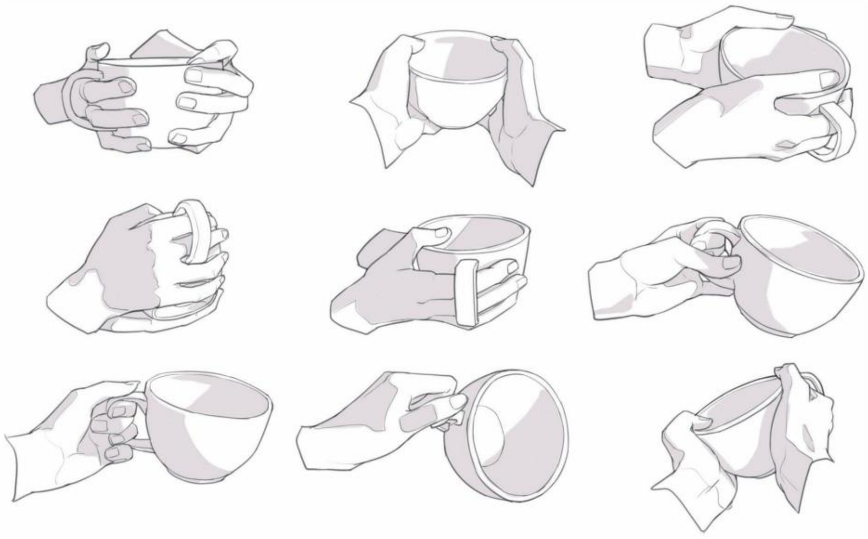
Do a set of exercises on how to hold a pen.



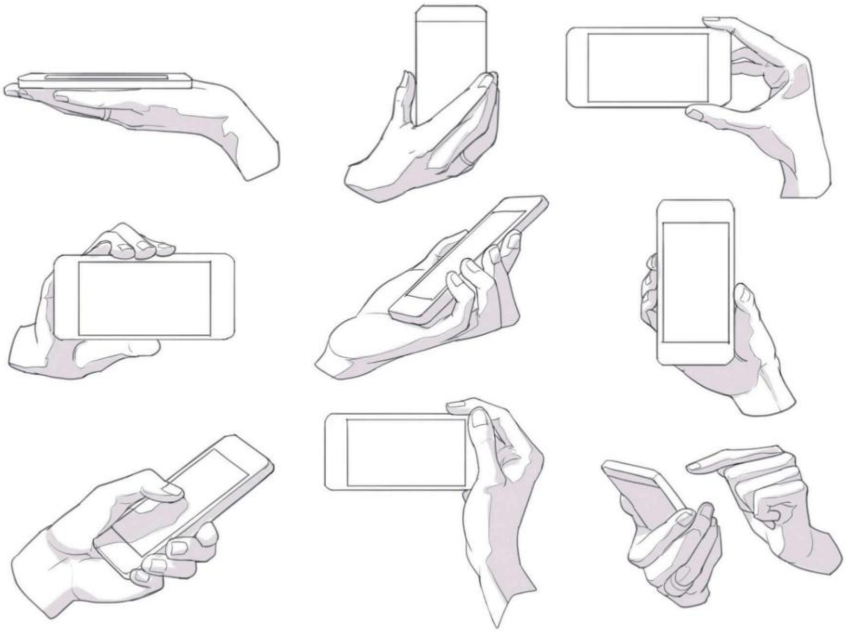
Practice holding a gift box.



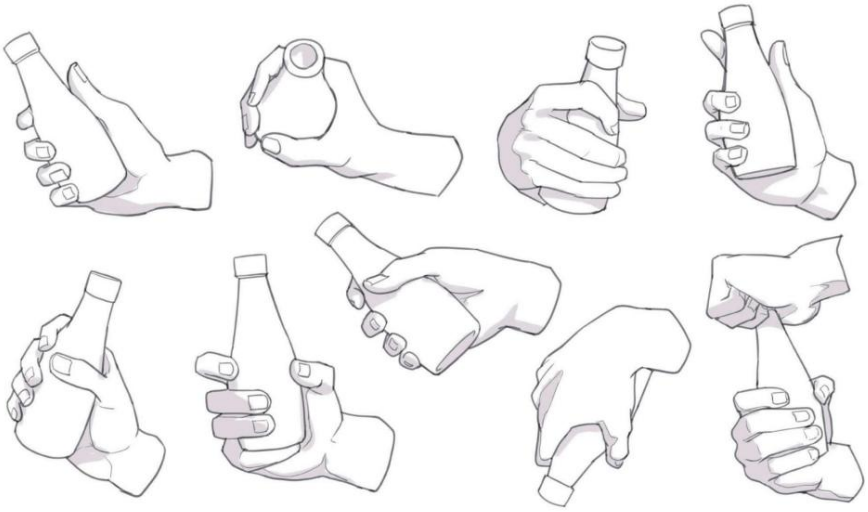
Do a set of exercises on how to hold a cup.



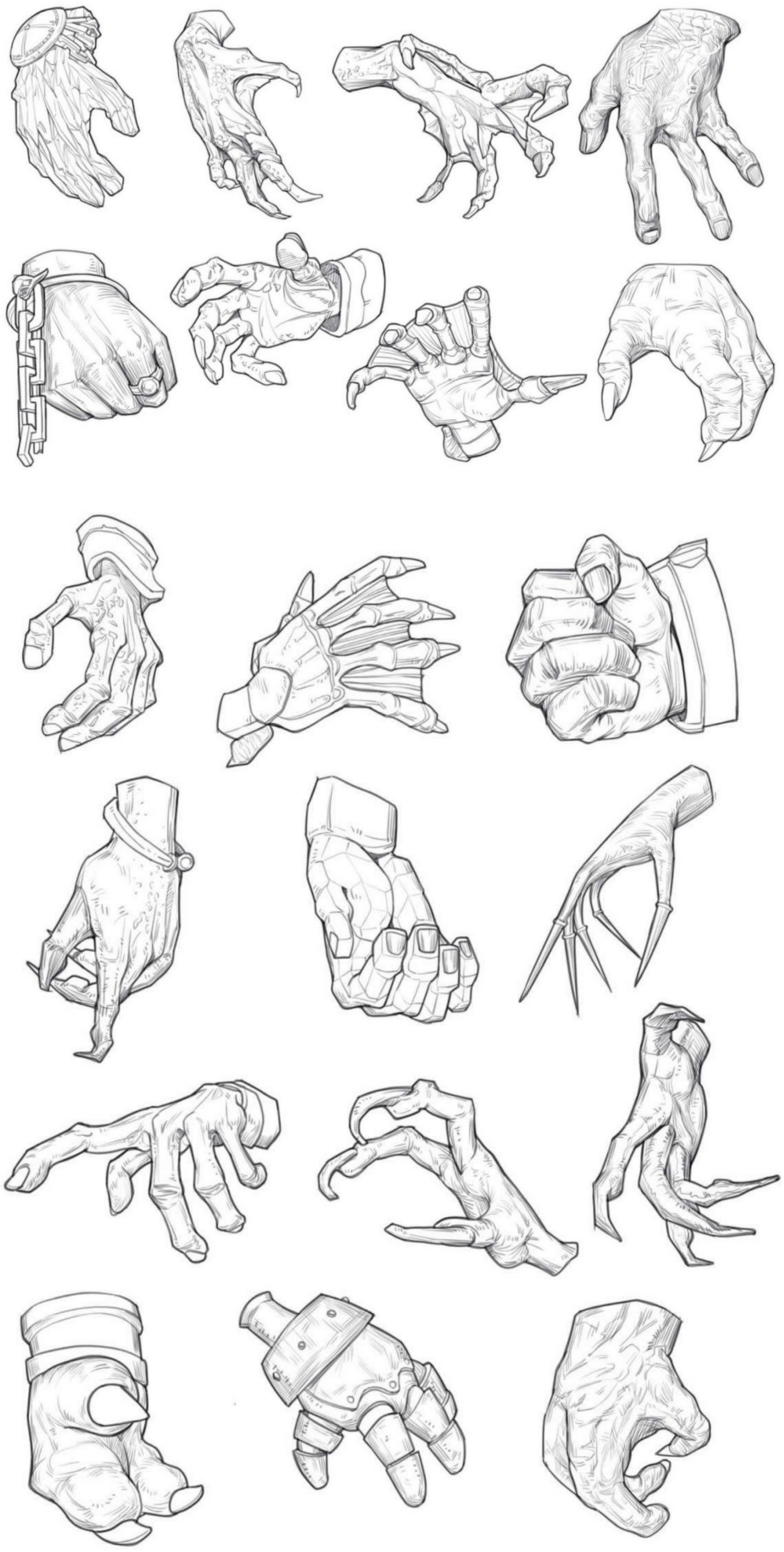
Do a set of exercises on how to hold a phone.



Do a set of exercises involving holding a wine bottle.



Do a set of exercises in the orc hand shape.



Chapter 6 Foot-Specific Training

exist In painting, the feet are the easiest part to overlook, especially the depiction of the toes. Feet The lifelike quality of a drawing depends on the accuracy of the toe structure and the ingenuity of their combination. This chapter provides an in-depth explanation of the foot's structural proportions, skeletal and muscular representation, connections, and twisting motions, culminating in a demonstration of various foot movements.

6.1 Proportional Structure of the Foot

The structure of the foot is similar to that of the hand. By understanding the proportions and structure of the foot, one can quickly develop an understanding of it.

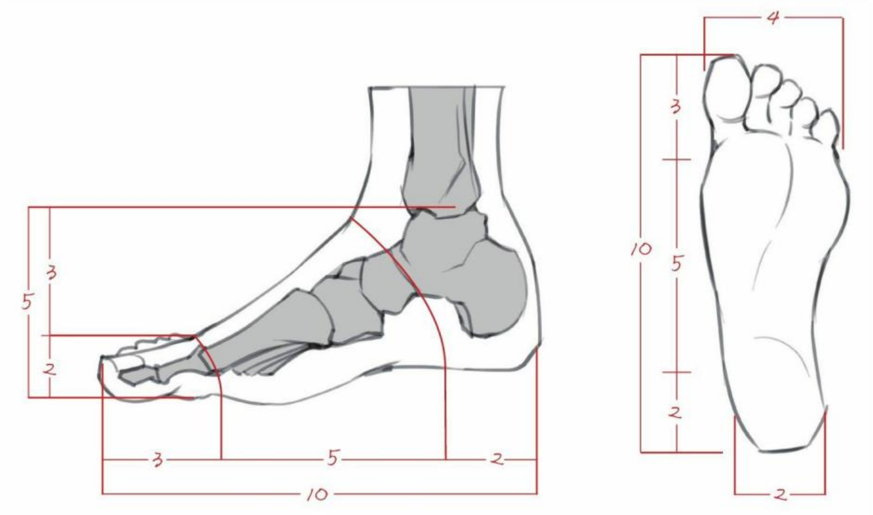
6.1.1 Proportion

Measured from the ankle, the ratio of the foot's height to its length on the side is approximately 1:2, and the ratio of the width of the foot's to its heel when viewed from the front is

approximately 1:2. The side of the foot is divided into three parts: the toes, the ball of the foot, and the heel, with the length ratio being...

3ÿ5ÿ2ÿ

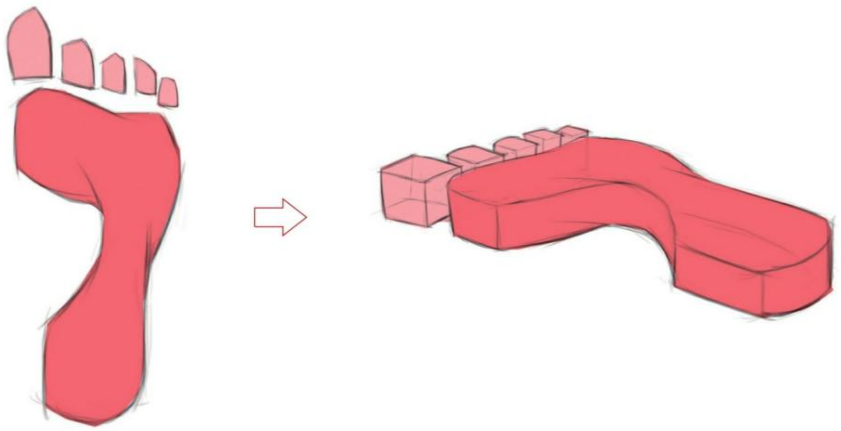
The foot is divided into two parts longitudinally from the side: the toes and the instep, with a height ratio of 2:3.



6.1.2 Structure

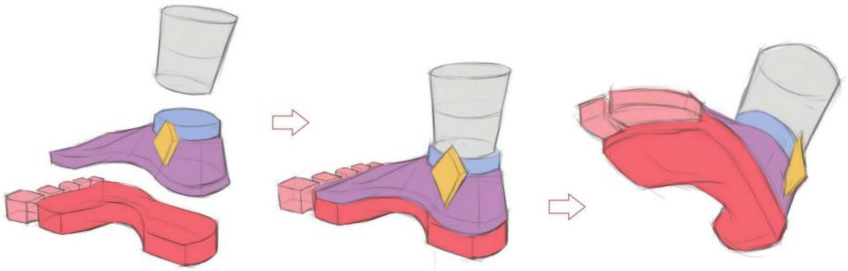
To make it easier to understand, the foot can be divided into the sole, toes, instep, and the lower leg that connects to the foot. Before drawing, first create a bottom view of the foot, then draw the corresponding parts according to perspective.

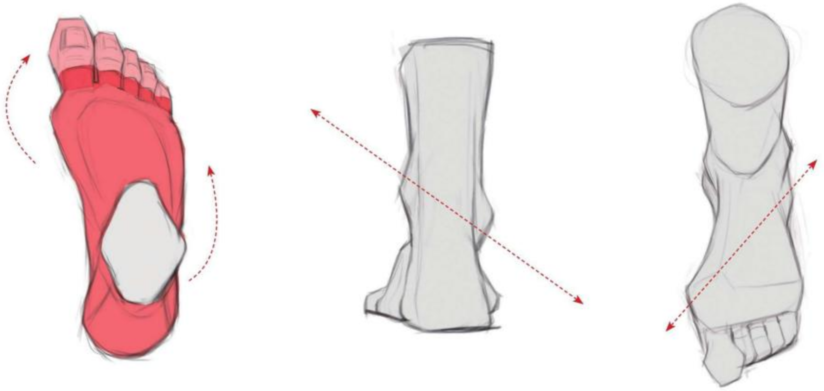
The thickness.



Next, draw the instep, calf, and ankle to show the complete shape of the foot.

Alright.





hint

The front and bottom of the foot are not symmetrical; the inner side of the ankle is higher than the outer side, meaning the side with the big toe is higher than the side with the little toe. Only by understanding these differences in elevation can one...

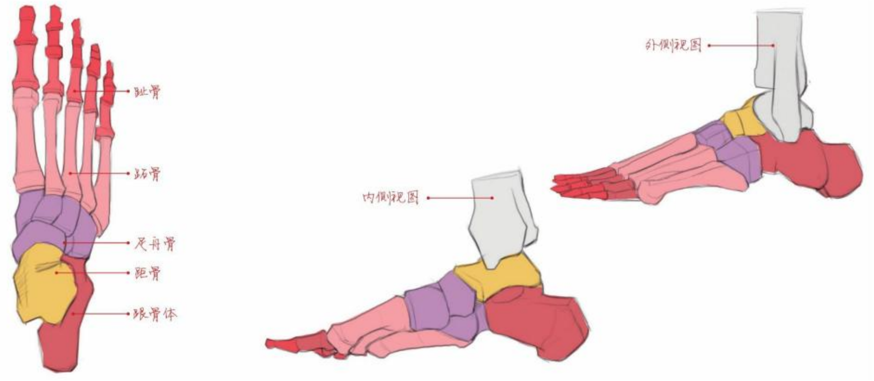
It can effectively depict the dynamics of the feet.

6.2 Influence of foot bones and muscles on body surface appearance

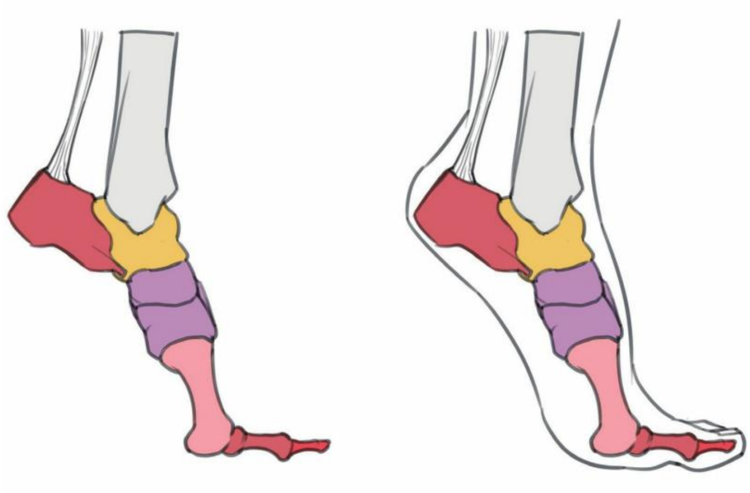
This section examines the influence of foot bones and muscles on the body surface. When drawing, pay special attention to remembering how key bone points and the stretching of important muscles affect the shape of the foot.

6.2.1 Influence of foot bones on body surface appearance

Observe the image below carefully; you can see that the sole of the foot is longer than the palm, and the toes are shorter than the fingers. (Foot) Dynamics mainly rely on the movement of the ankle, making it simpler to depict foot dynamics than hand dynamics.

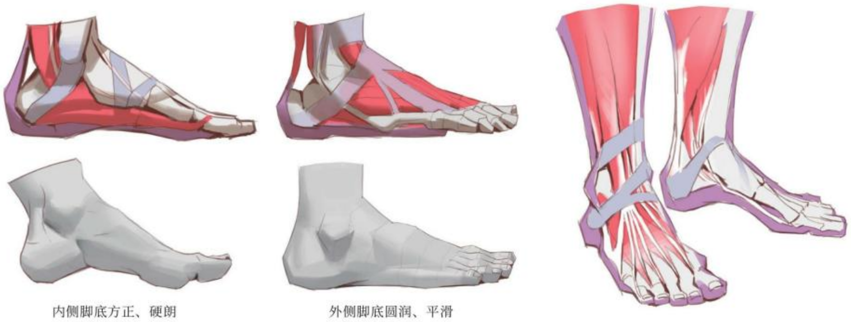


The following diagram illustrates the comparison between the foot bones and the foot contour. It can be seen that the heel and the forefoot... With less muscle and fat covering it, the forefoot is the main point of support when the foot contacts the ground.



6.2.2 Influence of foot muscles on body surface appearance

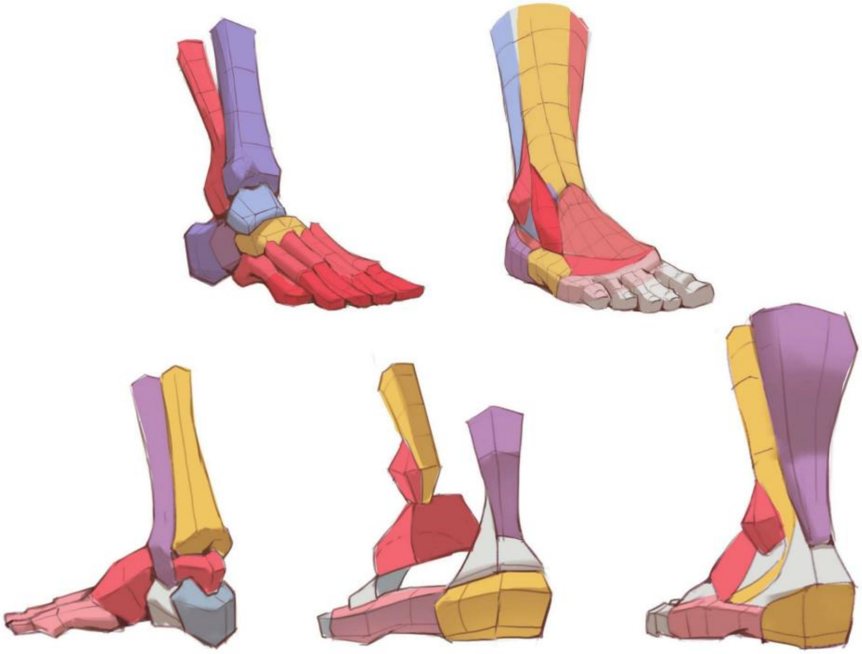
Viewed from the outside, the sole of the foot appears more square and sturdy due to the greater undulations in its bone structure. Viewed from the inside, the sole of the foot appears more rounded and smooth due to the greater amount of muscle covering it.



内側脚底方正、硬朗

外側脚底圓润、平滑

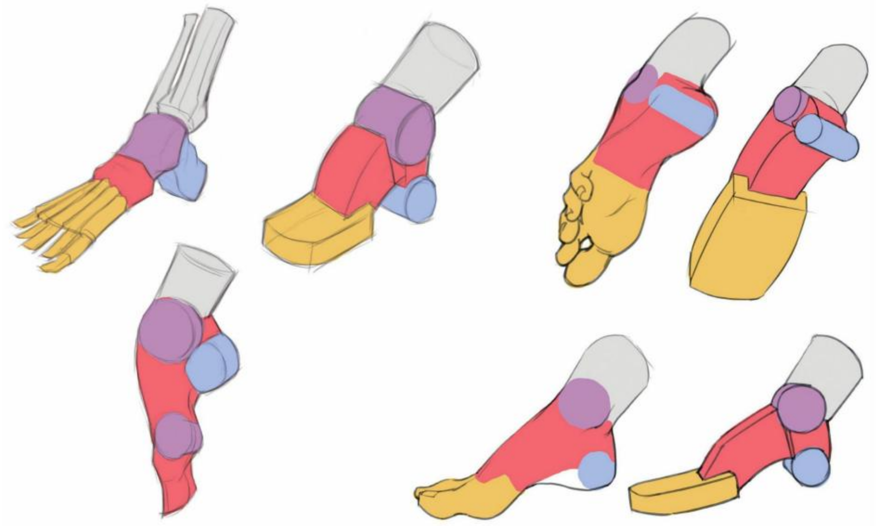
The effect of muscles attaching to bones on the body surface is illustrated below.



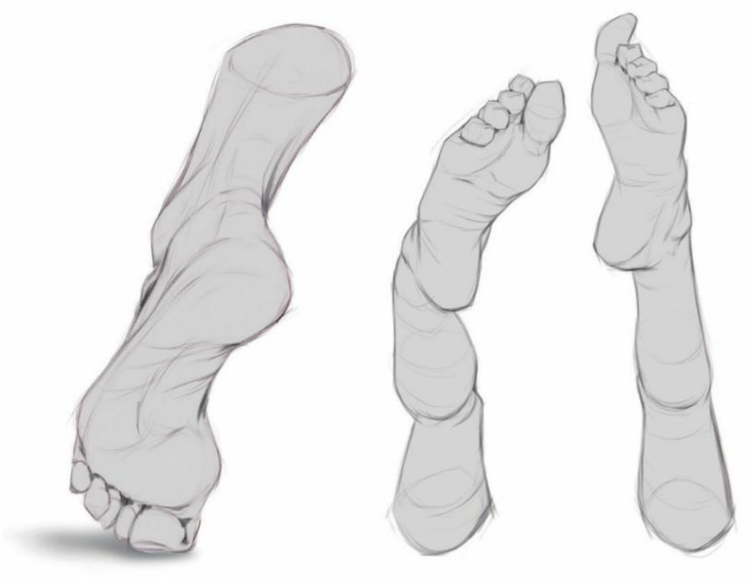
6.3 Connections of the feet

The connections in the foot include the connections at the ankle and the toes. The ankle has a greater range of motion, while the toes have a smaller range of motion. To draw the foot vividly, it is important to show the connections between the feet.

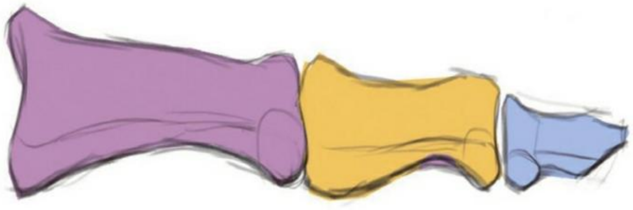
Below, we will dynamically assemble the structures of the foot to help understand the connection patterns of the foot. The ankle is viewed as a rotating axis, and the toes as a unified whole.

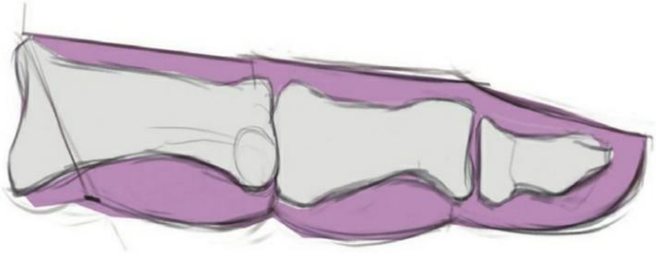


The ankle has a larger range of motion up and down, but a smaller range of motion left and right.



The connection at the toes is similar to that at the fingers, except that the toe joints are shorter.





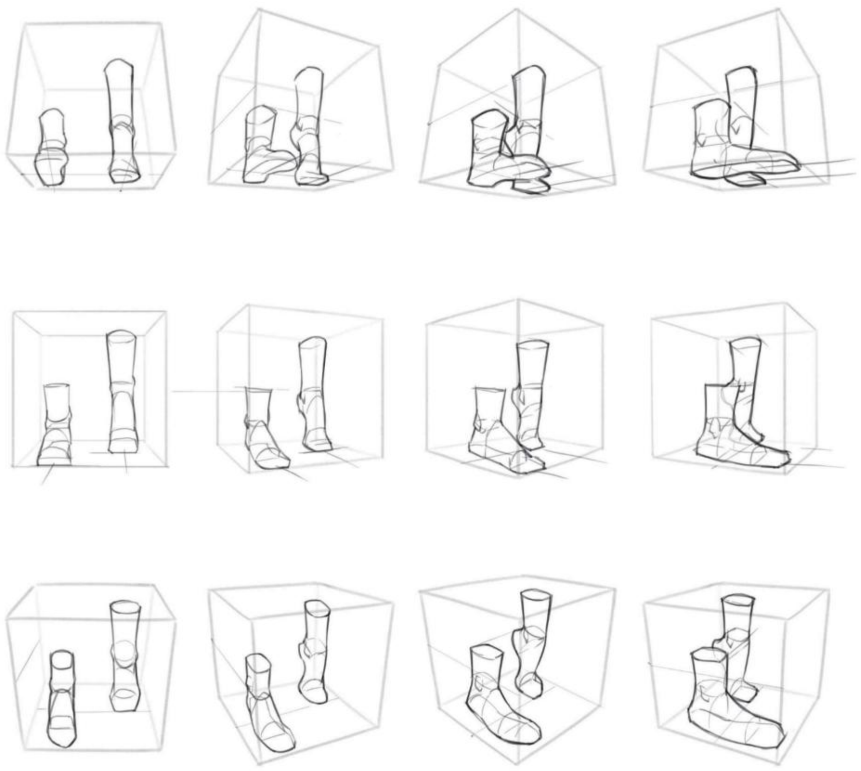
6.4 Foot torsion and dynamic performance

In many illustrations, feet don't appear very often. But even so, we should at least understand how the feet twist and move along with the legs to improve the overall quality of the artwork.

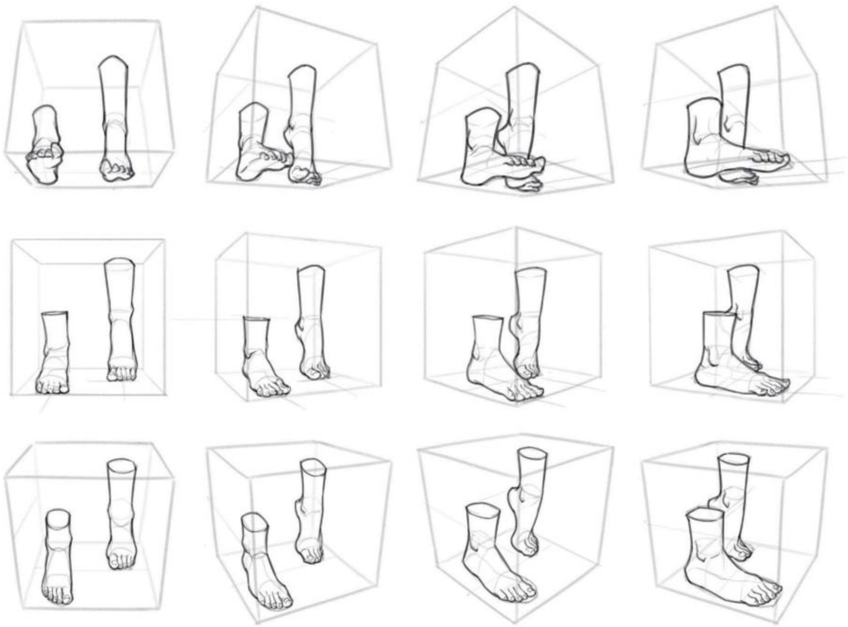
6.4.1 Foot Twisting

To accurately represent the various angular relationships of the foot, it is necessary to first establish a cubic volume. between.

Within the cubic volume, sketch the approximate position and structure of the feet in dynamic pose, such as... As shown in the image below.



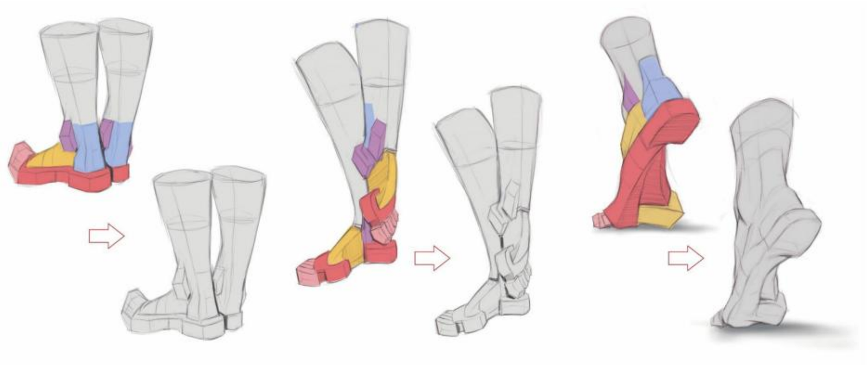
Based on the general structure, the foot contour is refined under the influence of bones and muscles, as shown in the figure below.

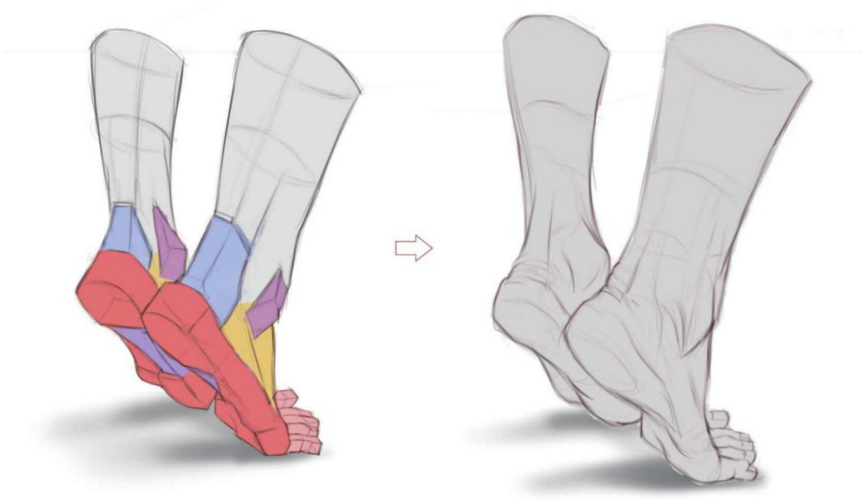


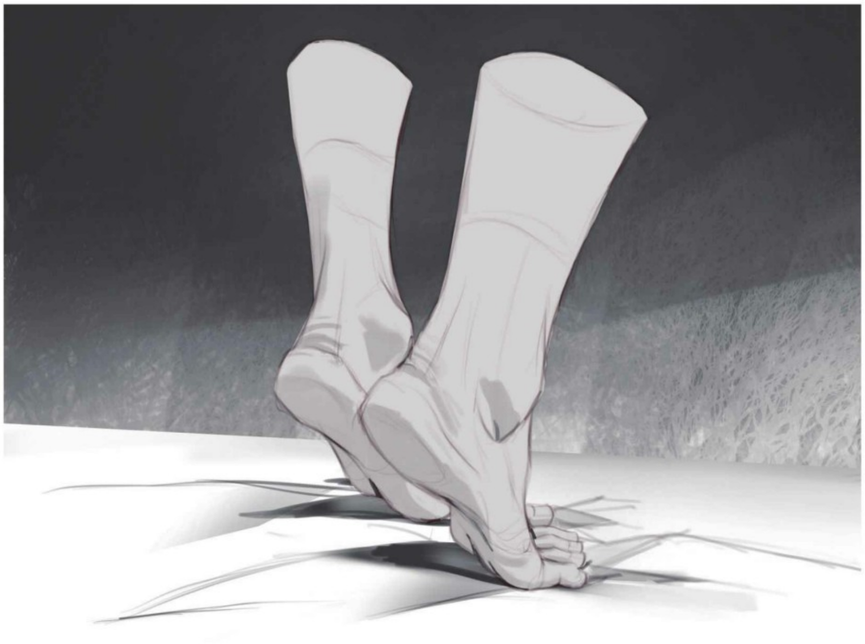
6.4.2 Dynamic performance of the foot

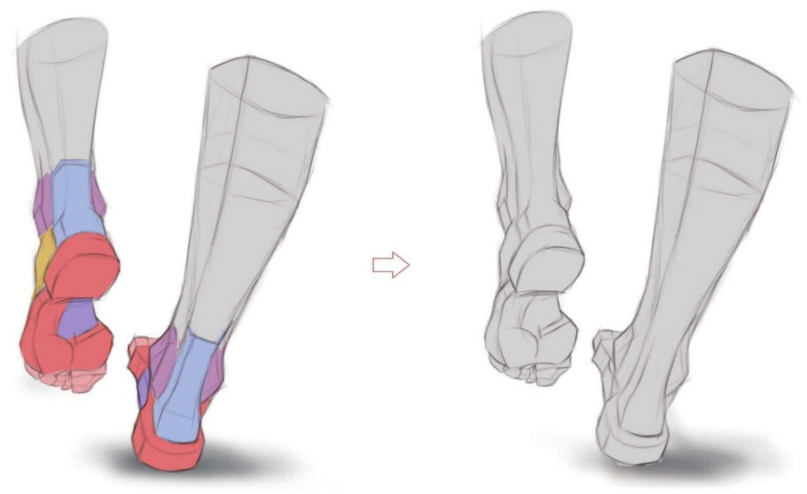
When depicting foot dynamics, attention should be paid to the structural interrelationships and range of motion; the toes are often...

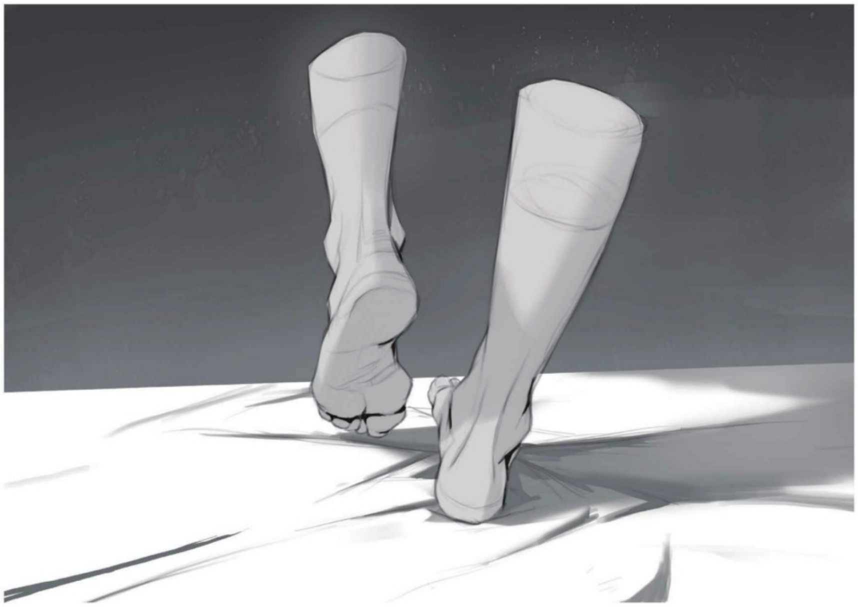
The key to depicting details in painting.

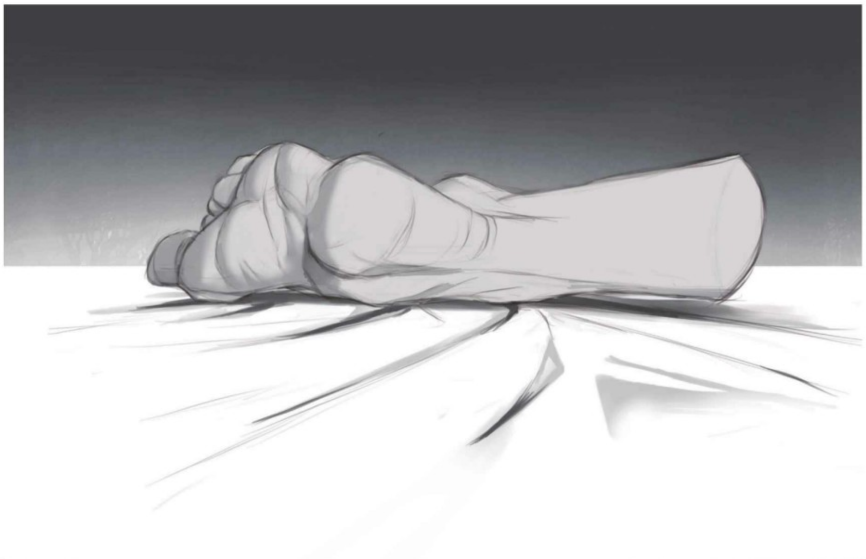


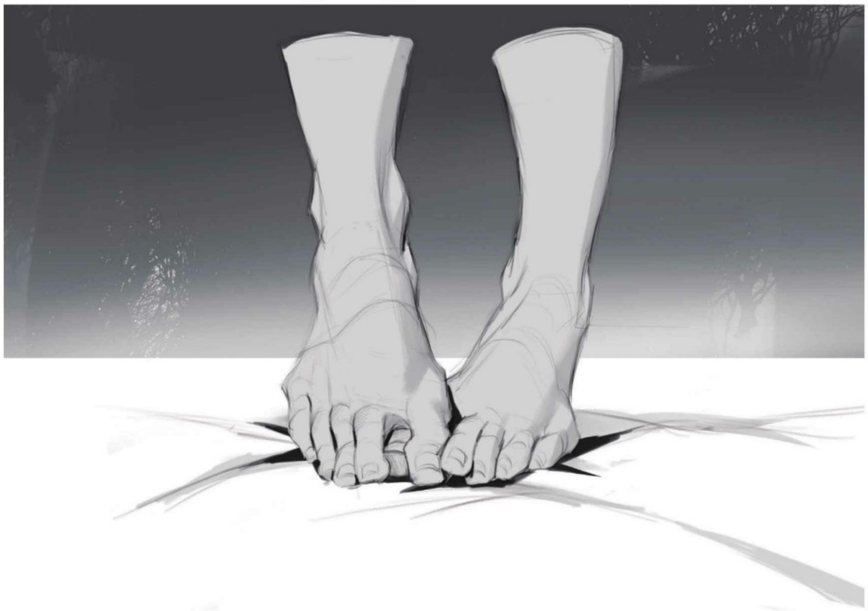


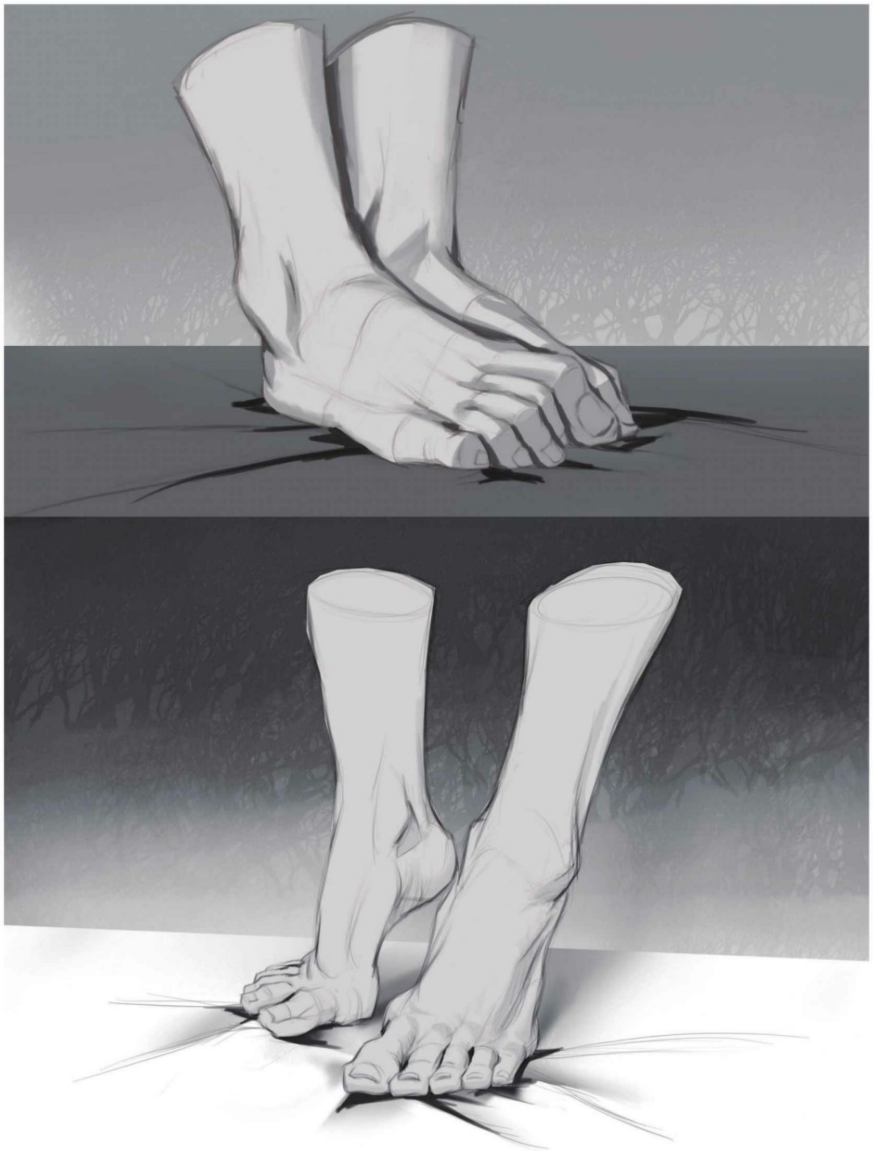






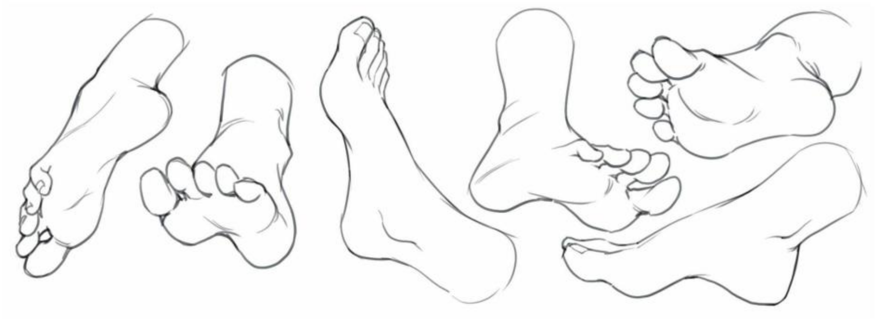




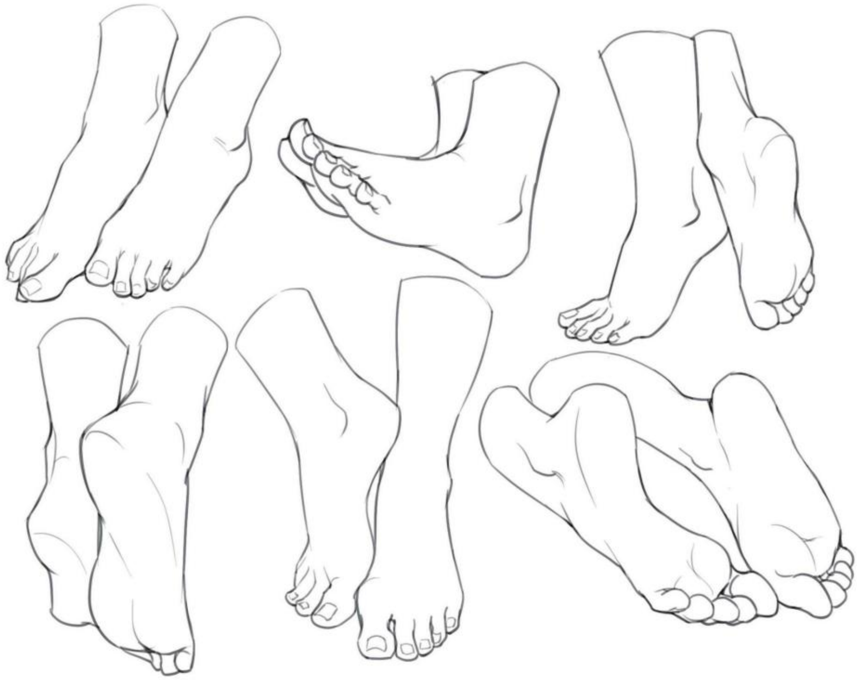


More specialized training

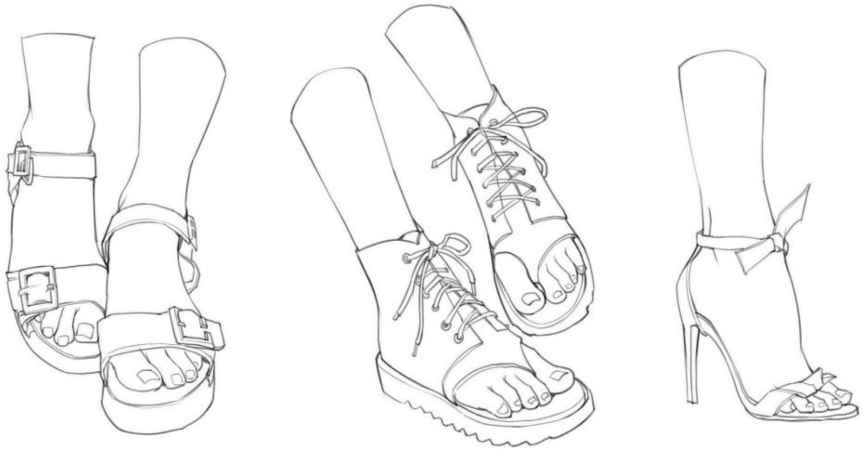
Do a set of single-leg exercises.



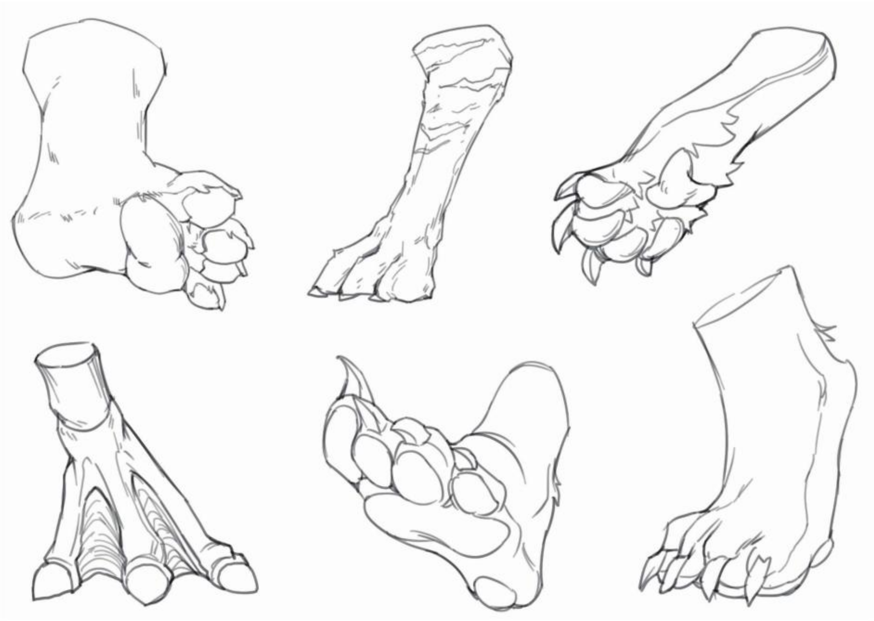
Do a set of bipedal exercises.

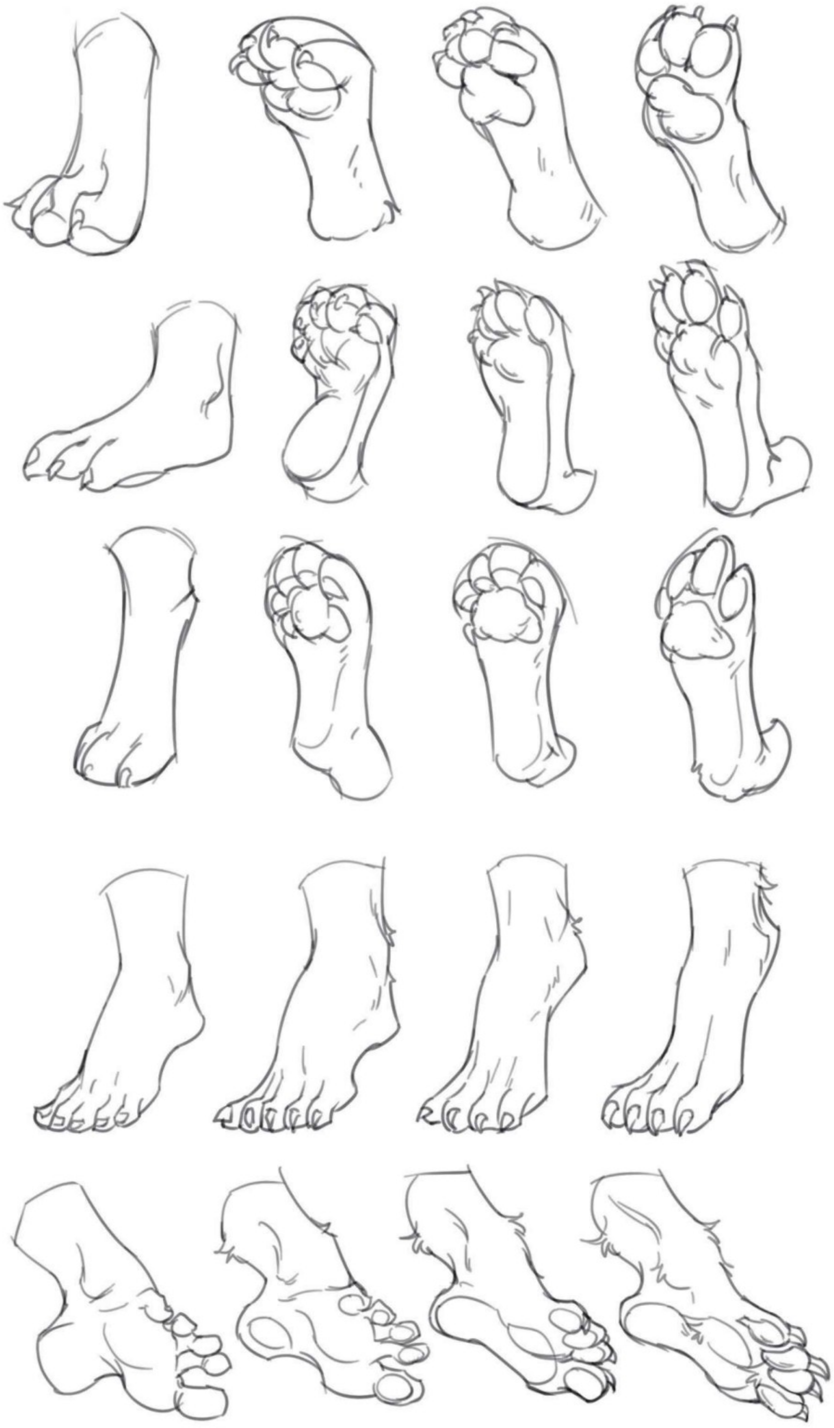


Do a set of foot exercises while wearing shoes.



Do a set of animal foot exercises.





Chapter 7 Dynamic Specialized Training

Pass Through our previous studies, we have learned about the structure of the human body. This chapter focuses on explaining the human body... The course focuses on the form, the rotation of the human body in space, and the expression of human dynamics. It mainly addresses the problems that beginners face when drawing the human body, such as being afraid to exaggerate or distort it, or drawing it too flatly, thus laying the foundation for subsequent character modeling.

7.1 Human Body Type

Human body type is very important for character design. Different professions have different body types. For example, for a game character design, the warrior is characterized by a robust and muscular build, the mage by a slender and thin build, and the assassin by agility and nimbleness.

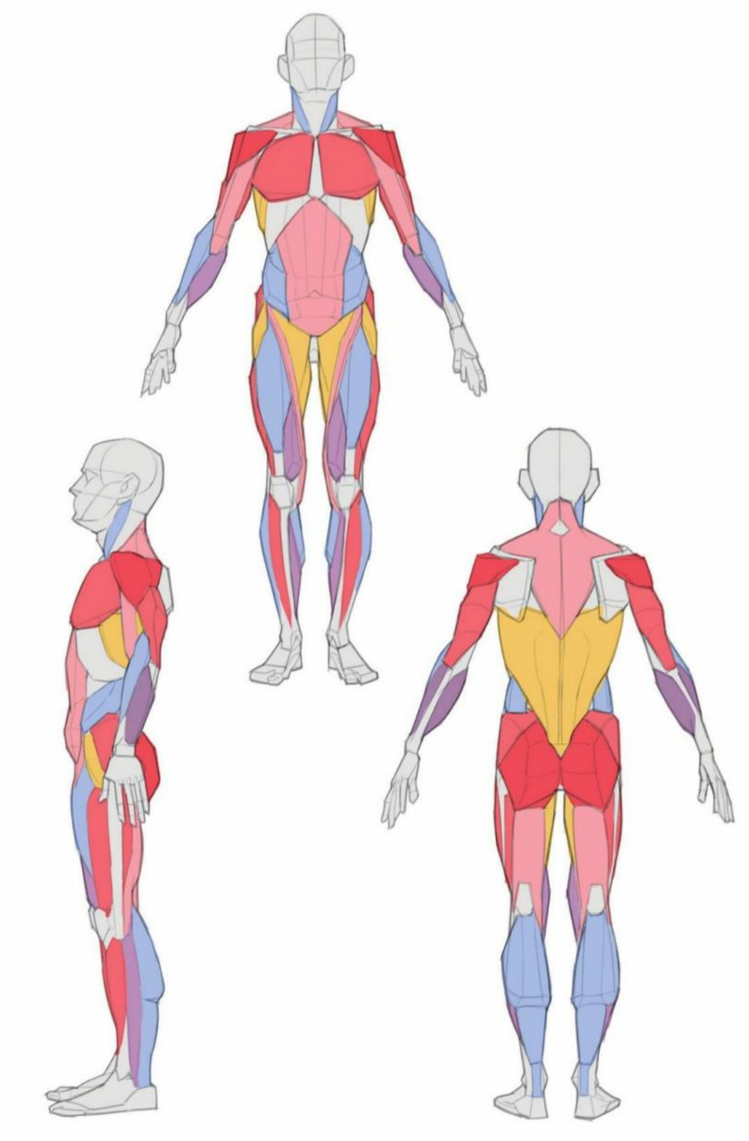
Besides occupational characteristics affecting a character's physique, factors such as age and gender also influence physique.

7.1.1 Normal body type

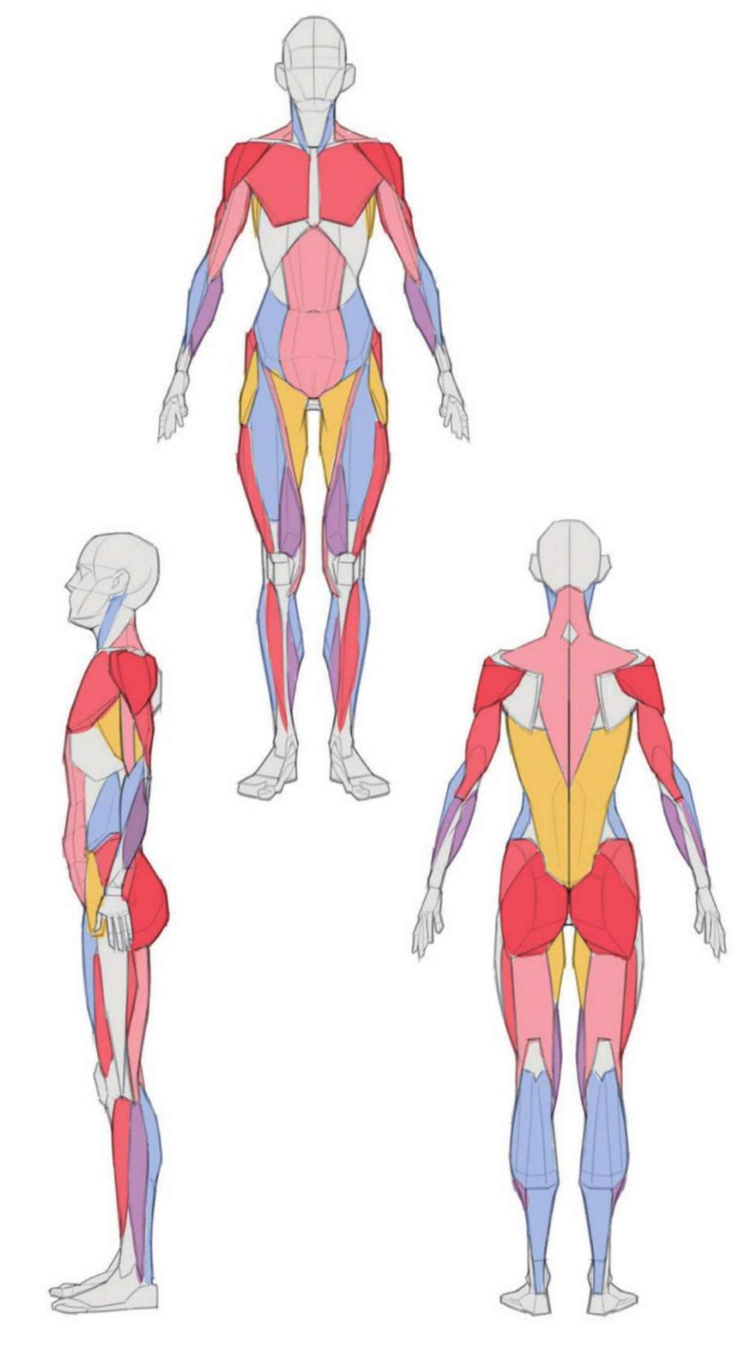
The average human body is 7.5 heads tall, but in artistic creation, in order to achieve the desired visual effect, Sometimes, men are depicted as having an 8-head-to-body ratio, while women are depicted as

having a 7.5-head-to-body ratio. Many people believe that men, being taller, have a significant advantage in head-to-body ratio. But why do people in real life perceive women as taller than men of the same height? Ignoring the influence of high heels, women appearing taller is primarily related to the differences in body shape between men and women. Observing the image below, it can be seen that men's waistlines are not very pronounced, while women's waistlines appear higher and more defined. A higher waistline makes the legs appear longer. The ratio of men's legs to torso is 5:5, while women's is 4:6, thus making women appear taller.

Similarly, in game design, the body proportions of characters such as warriors are set at 5:5 to make them appear more stable and reliable; while the body proportions of characters such as assassins and mages may be set at 4:6 or 3:7 to make them appear more slender and tall.



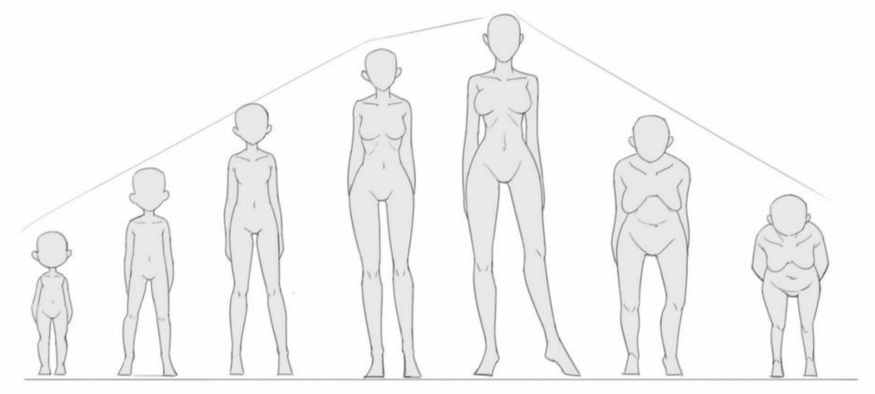
male



woman

Besides gender, body shape also changes with age, primarily in the proportions of the upper and lower body, and the size of the head. Children with short legs and large heads appear cuter, while adults with small heads and long legs are more in line with general aesthetic standards. Elderly people may appear shorter due to hunchbacks and stooped postures. Based on these characteristics, we can practice representing the same person's physique at different ages.

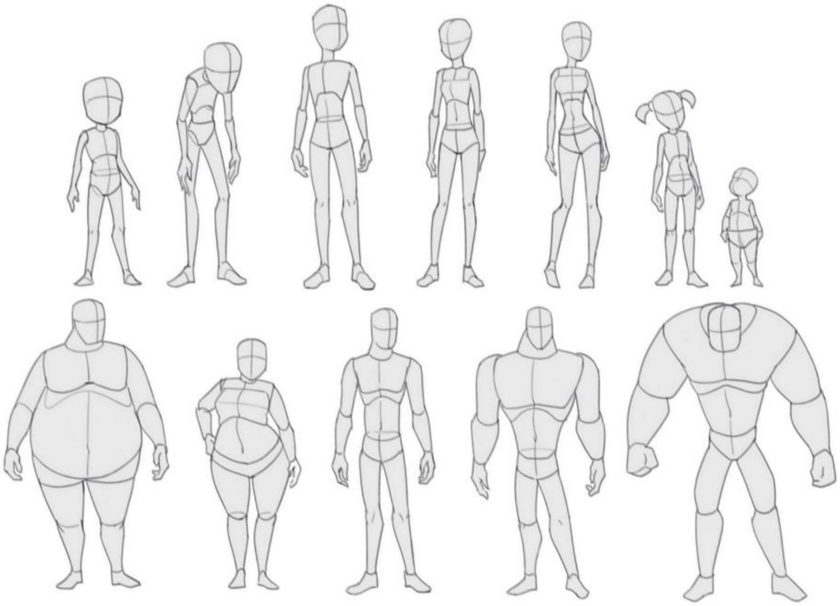
Type.

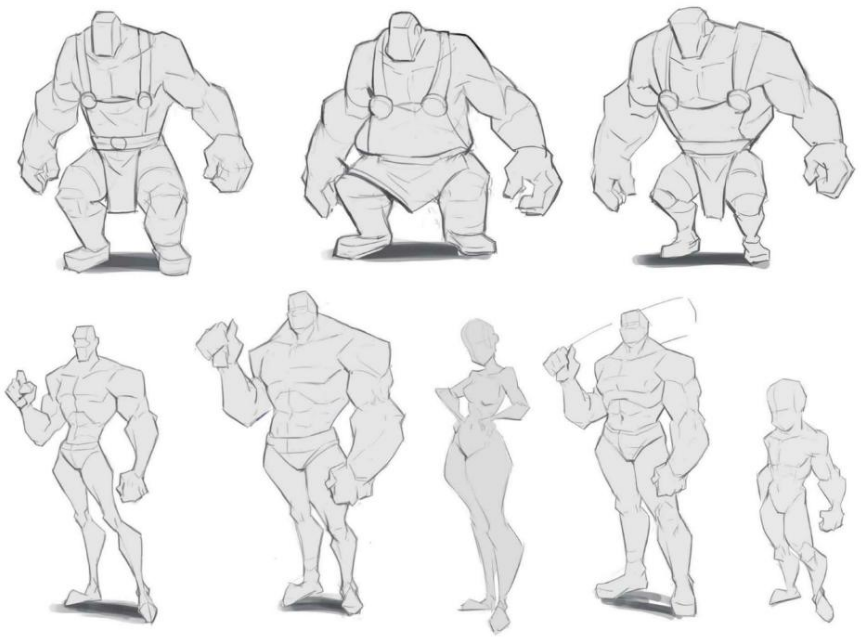


7.1.2 Exaggerated body shape

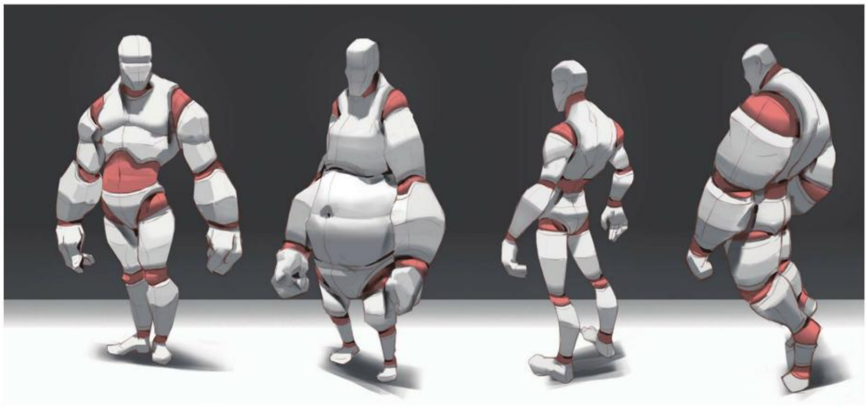
Besides normal body types, we can also see many animated works using exaggerated methods to depict...

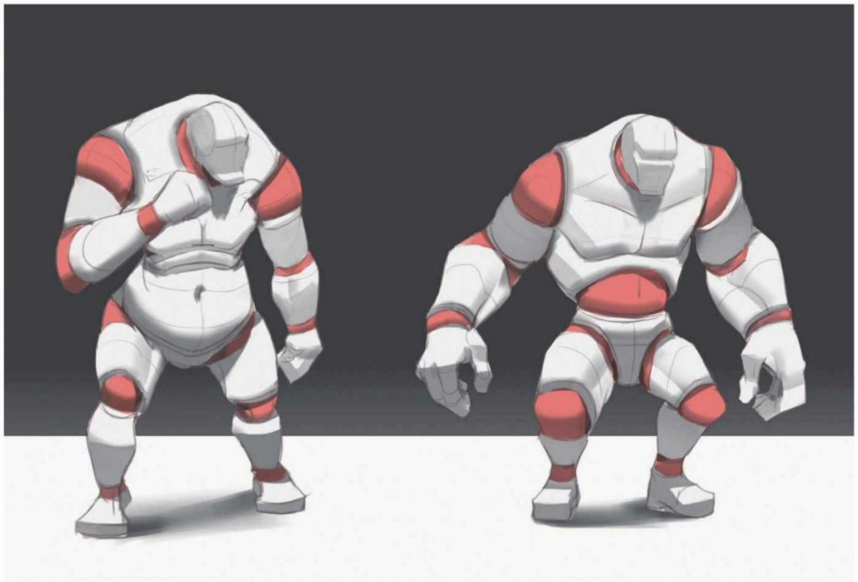
Humans of the same type.

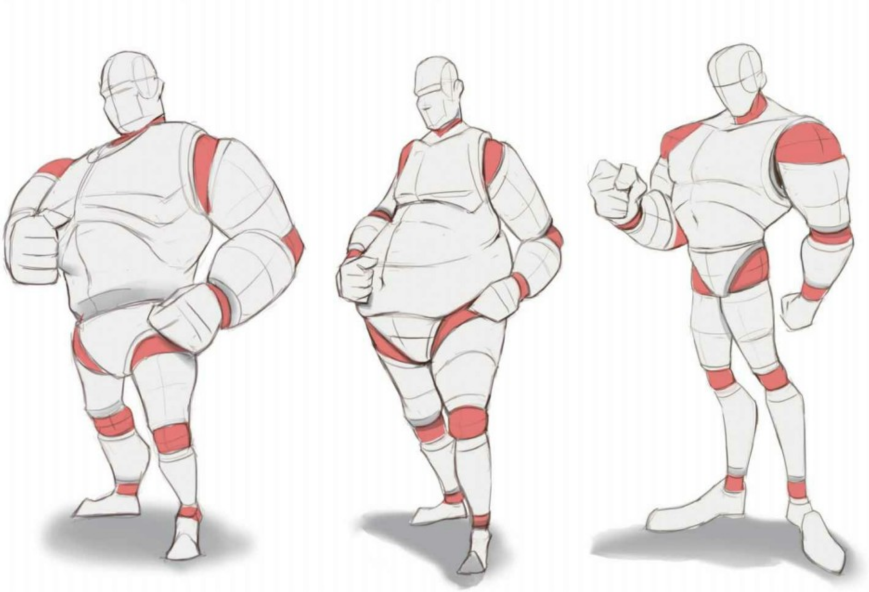


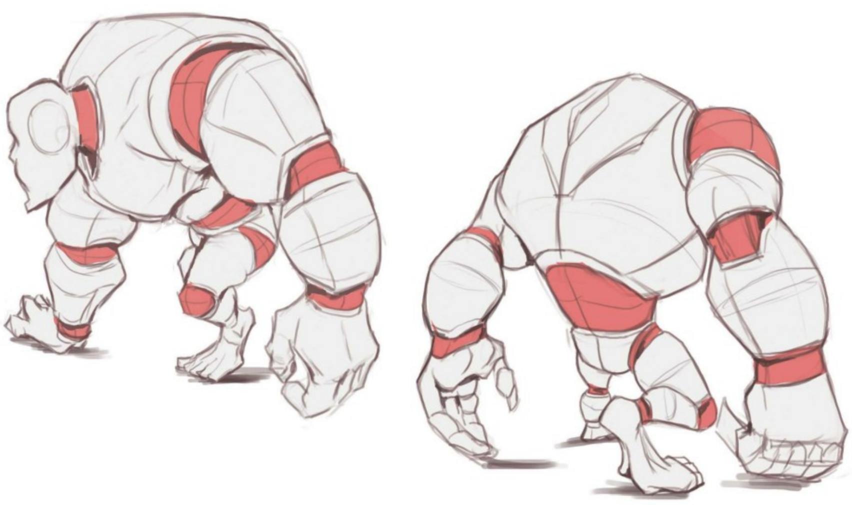


Note that the exaggeration mentioned here usually refers to a specific part of the body, such as the stomach. Exaggeration is meaningful only when the hips, waist, or arms are exaggerated, and these exaggerated parts contrast sharply with the other parts. If all parts are exaggerated, the drawn human form lacks distinctiveness.



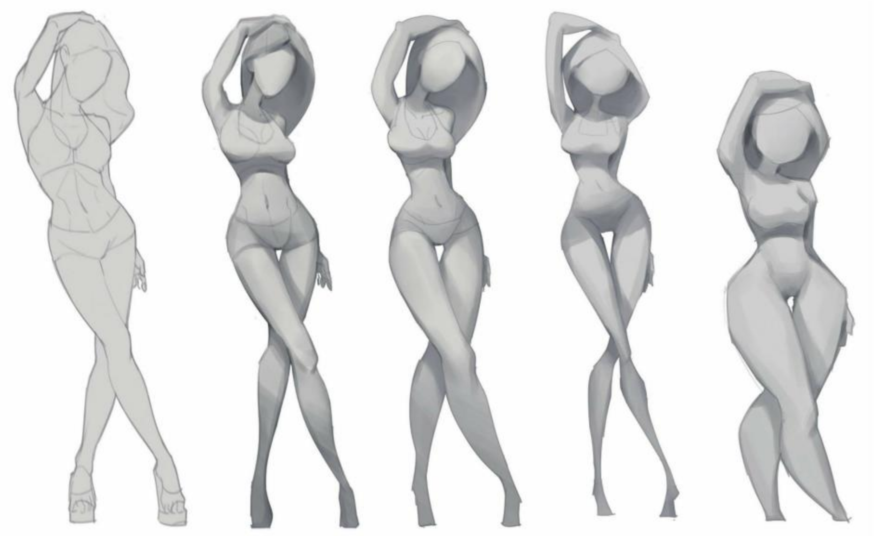






The following attempts to depict different body types of the same person. You can choose to refer to a photograph and use...

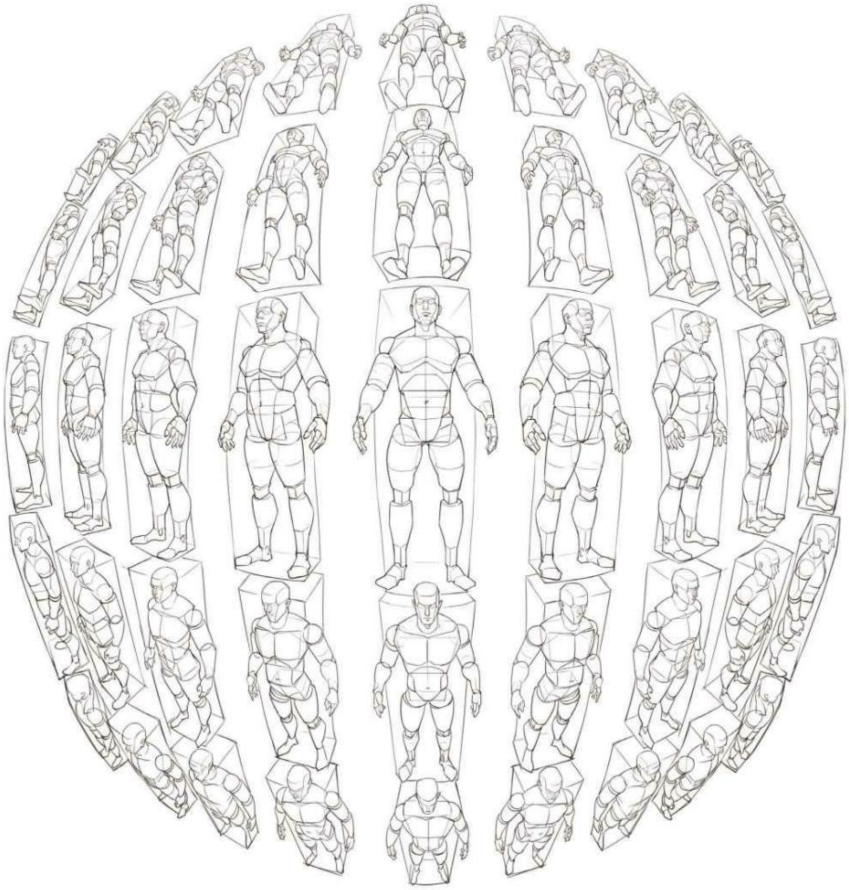
Emphasizing or exaggerating a certain part of a person's body in a photograph to represent different body types.



7.2 Human Body Mass Exercises

Human figure drawing exercises are fundamental to drawing the human body and help solve problems related to proportions in human figure drawing.

For example, the accuracy of perspective, space, etc.



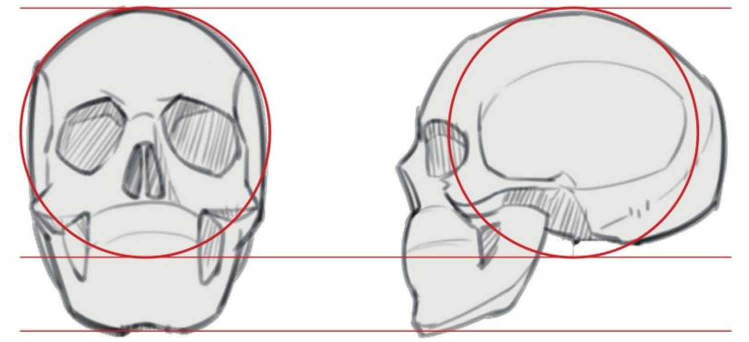
7.2.1 Human Body Proportions and Spatial Position

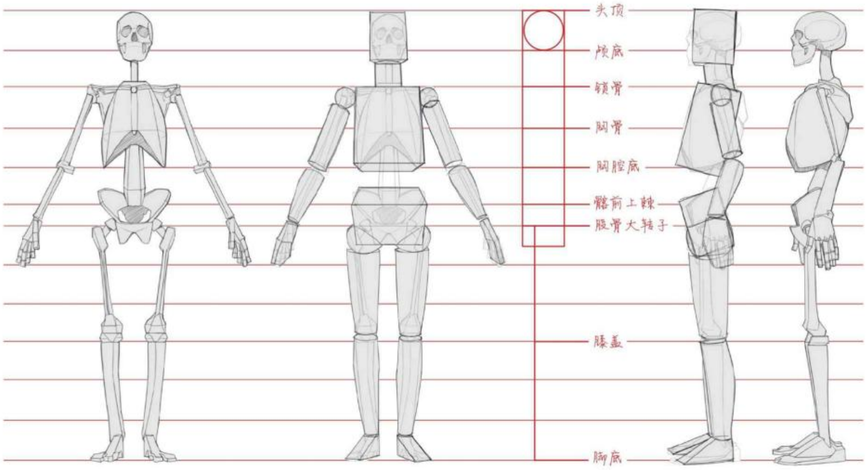
The human skeleton can be represented by blocks, and the proportions of these blocks represent the proportions of the skeleton in drawing.

When depicting human figures from different angles, it is important to pay attention to the proportions and perspective of the figures.

By visualizing the skull as a circle, and using this circle as a unit, the entire human body can be measured.

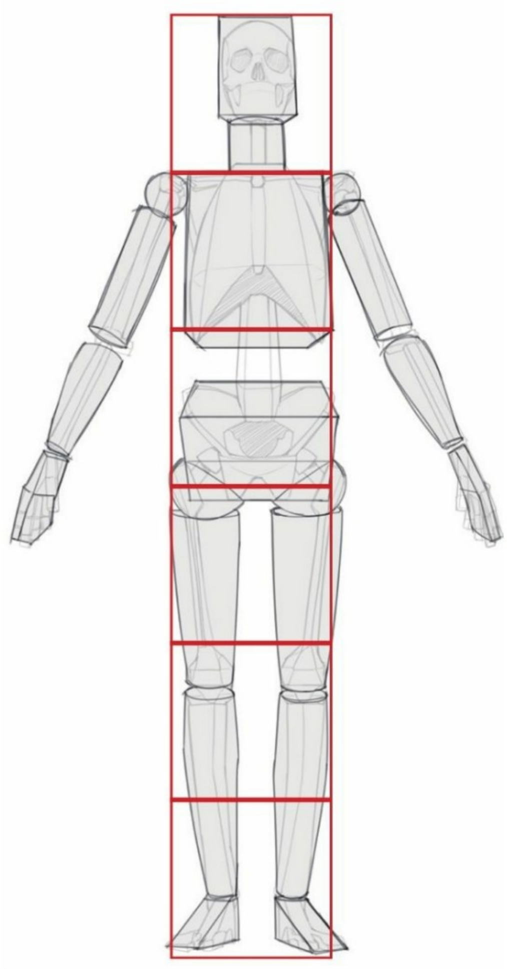
The proportional relationship.

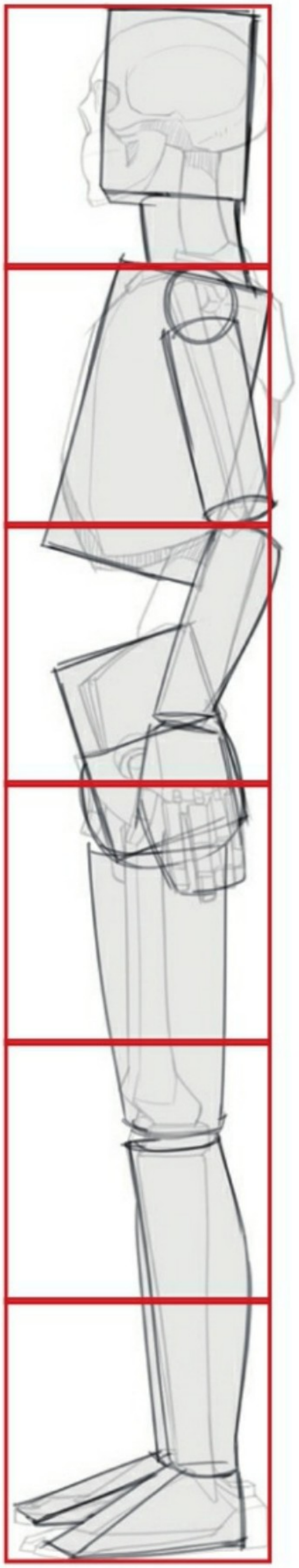




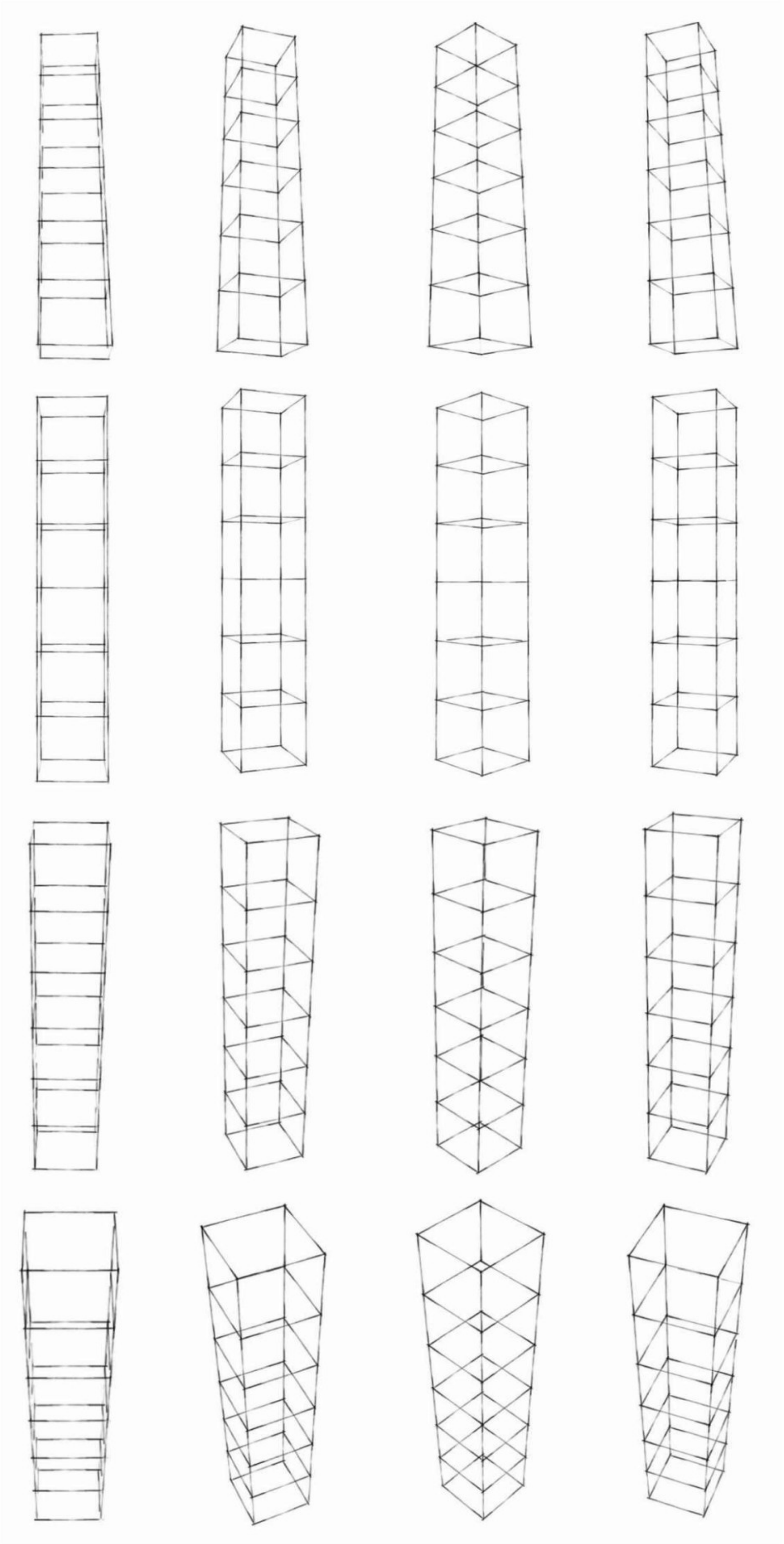
Once you understand the proportions of the human body from the front and side, you can place the human body in space. And its spatial location was deduced.

After memorizing the proportions of the human body, you can place the block representing the human torso into an equal square. Within a cuboid composed of body blocks, the spatial position of the human body block is determined.

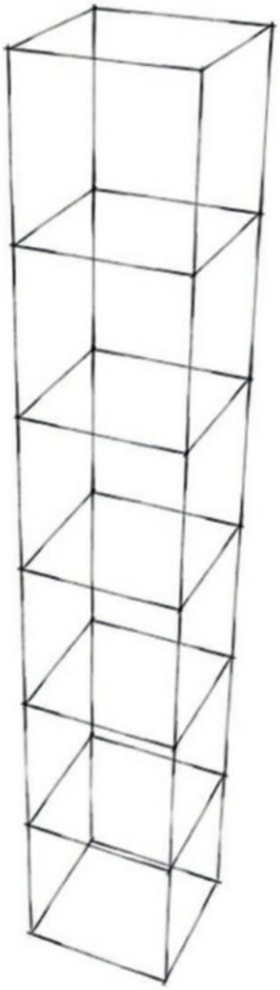


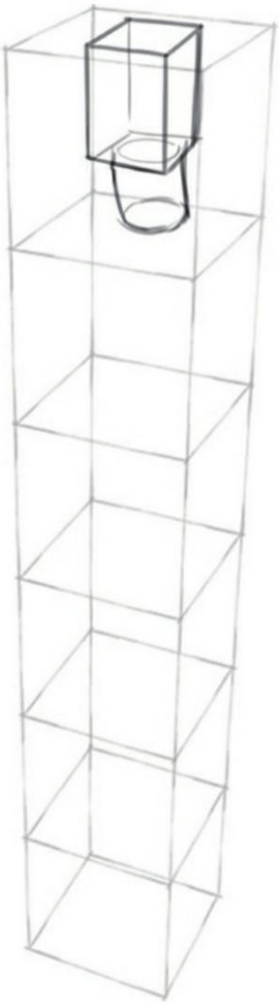


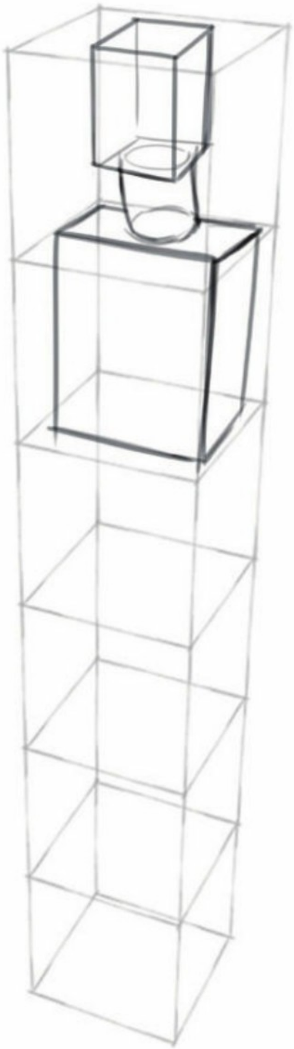
Draw a cuboid block composed of 6 equal cube blocks at different angles.

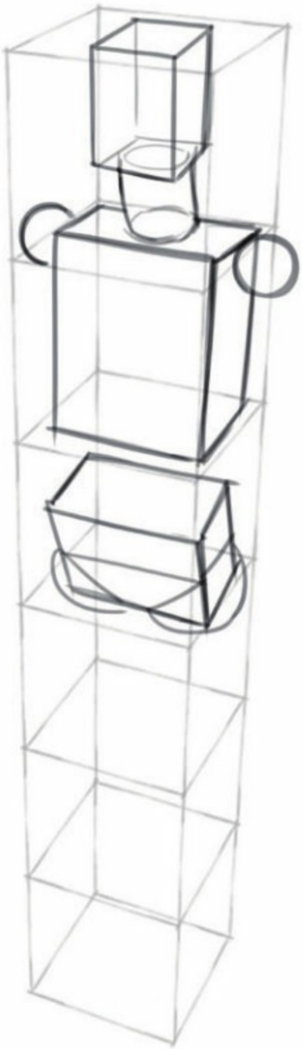


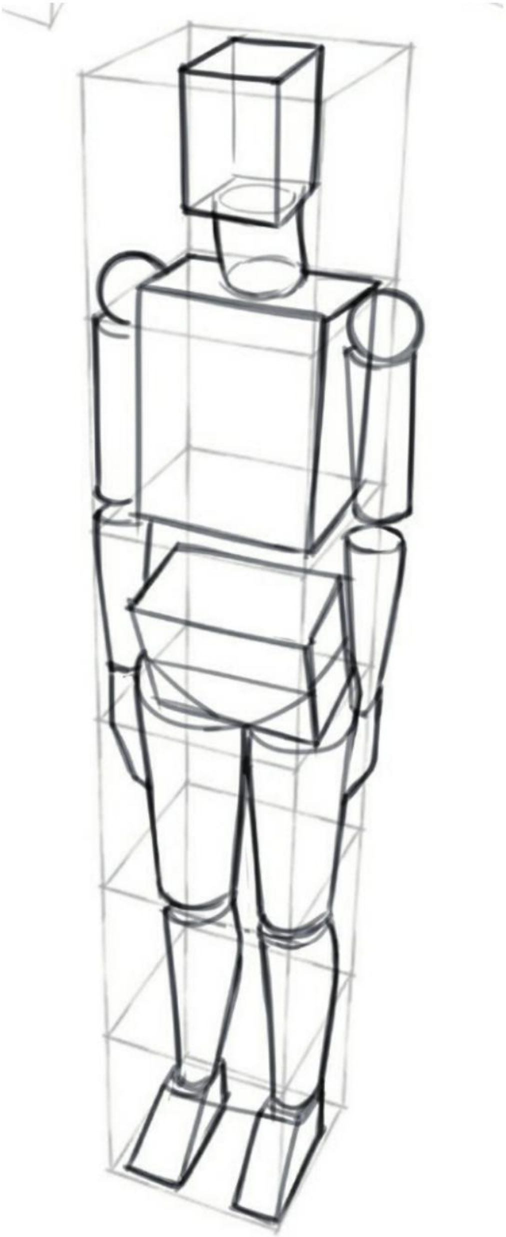
Place the outlined human body shape into the drawn cuboid frame.







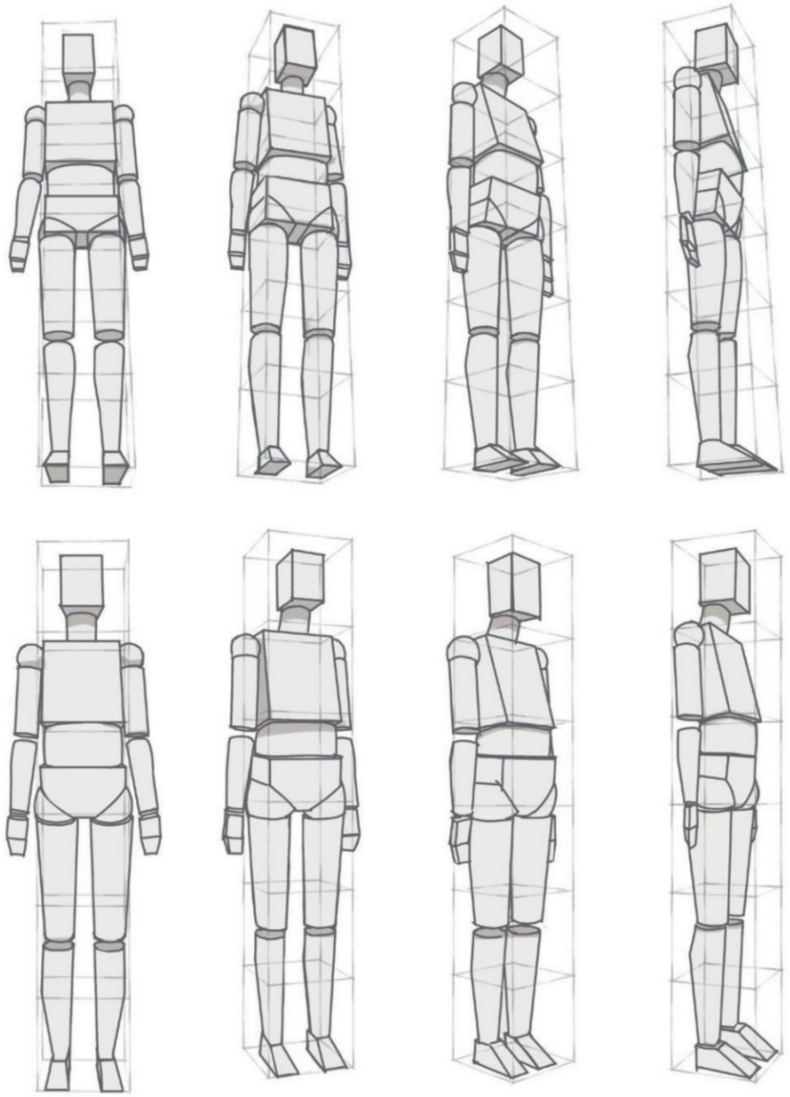


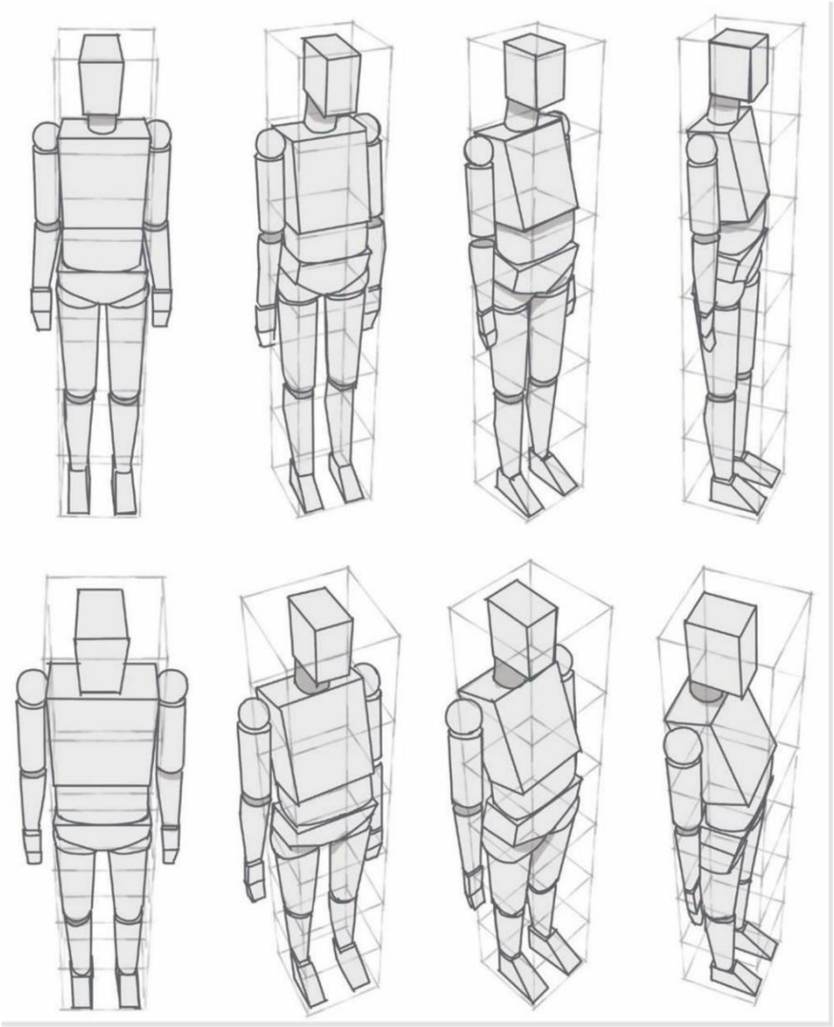


hint

The human body must be measured frame by frame before being placed into the frame and adjusted accordingly.

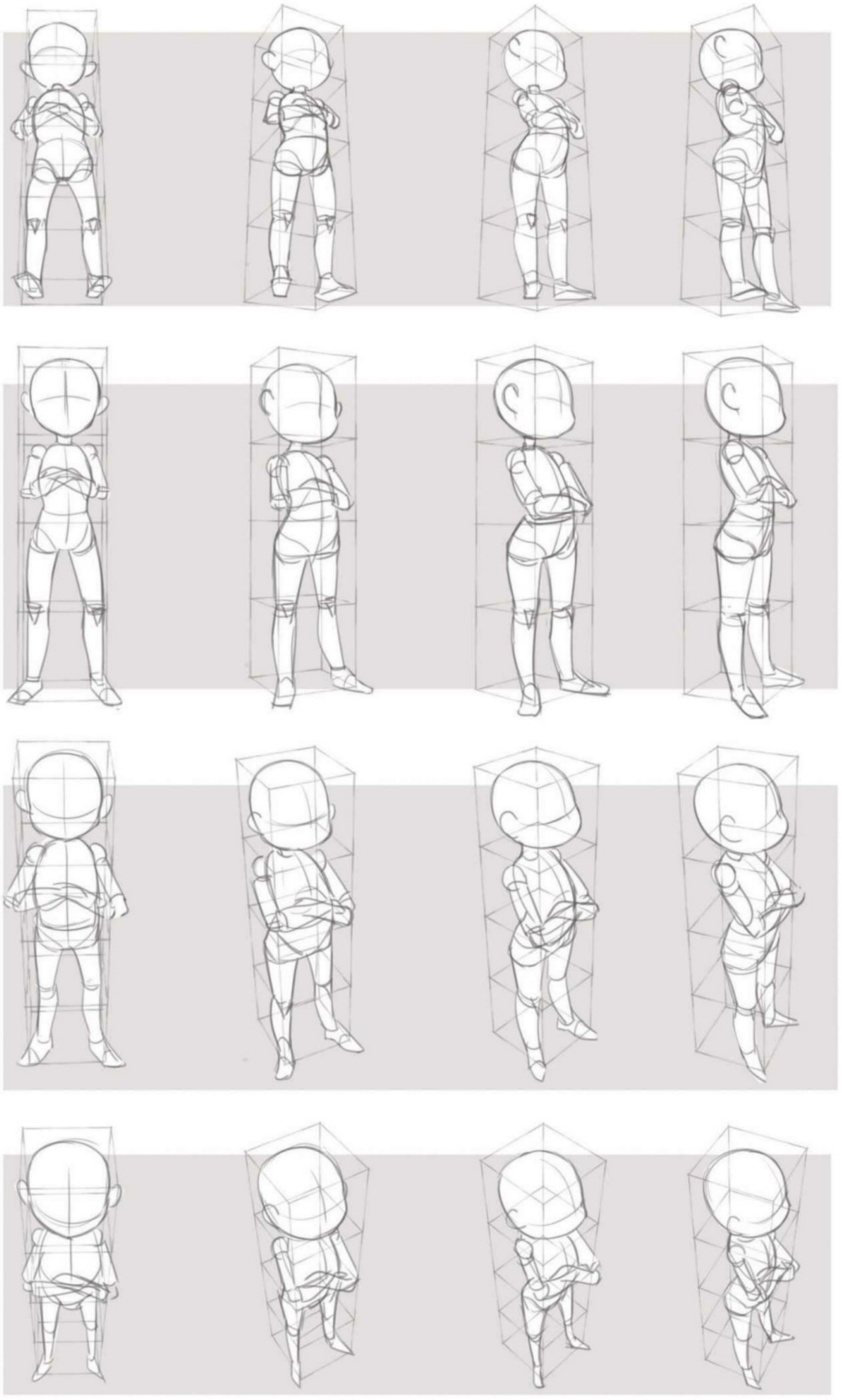
Perspective angles and positions of human body blocks.

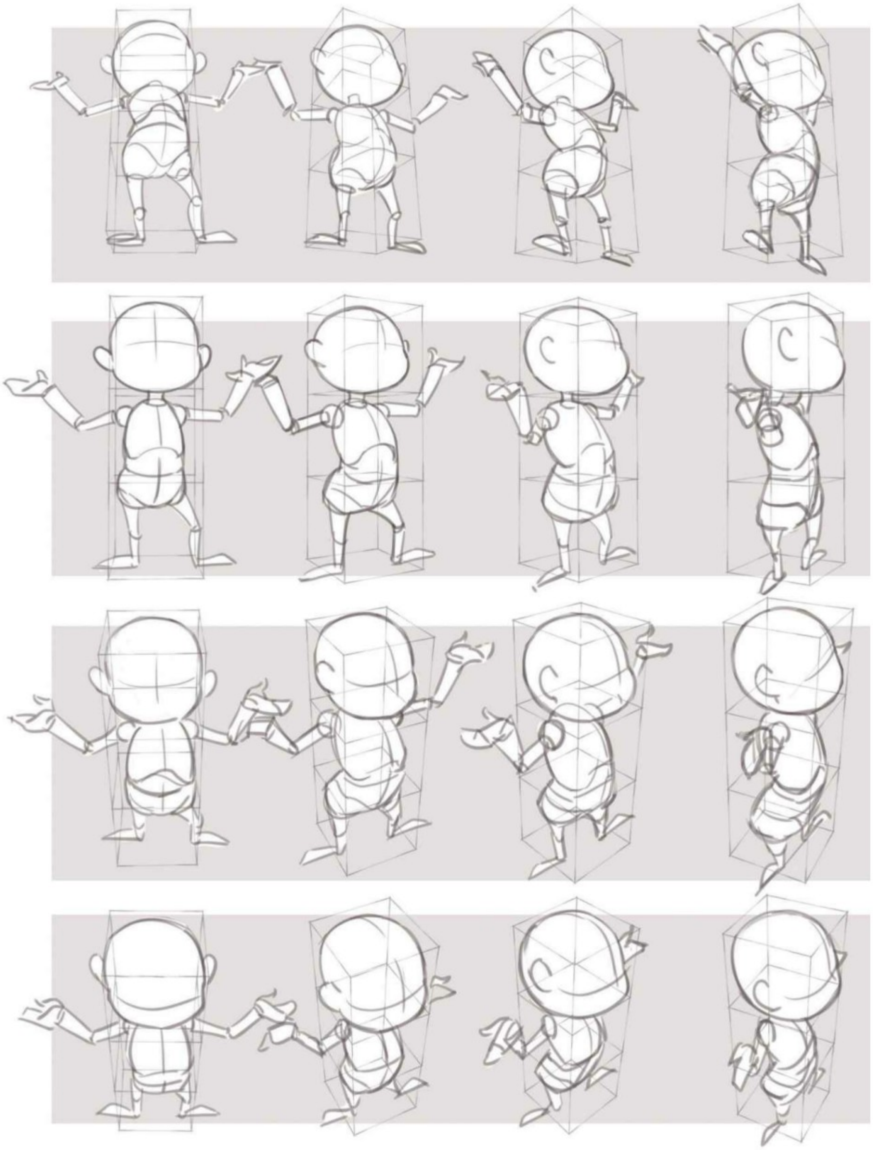


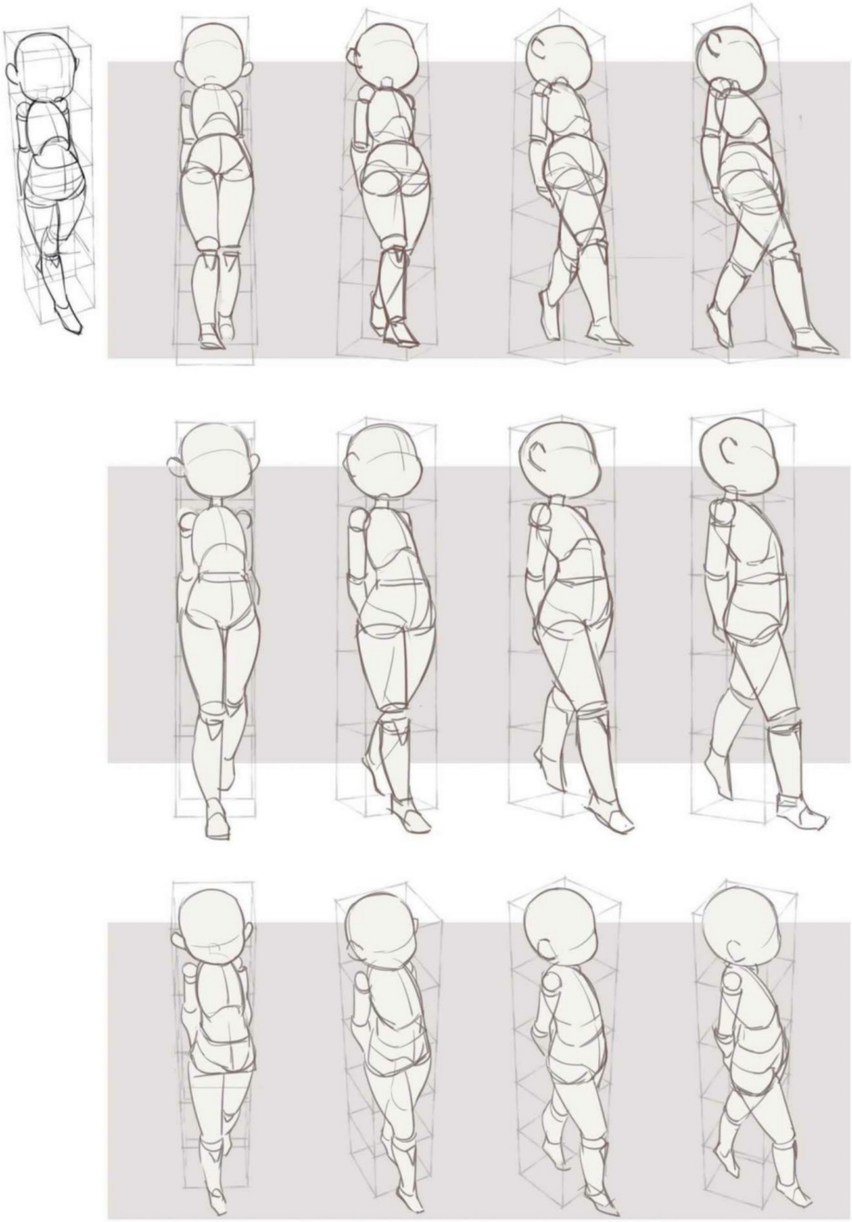


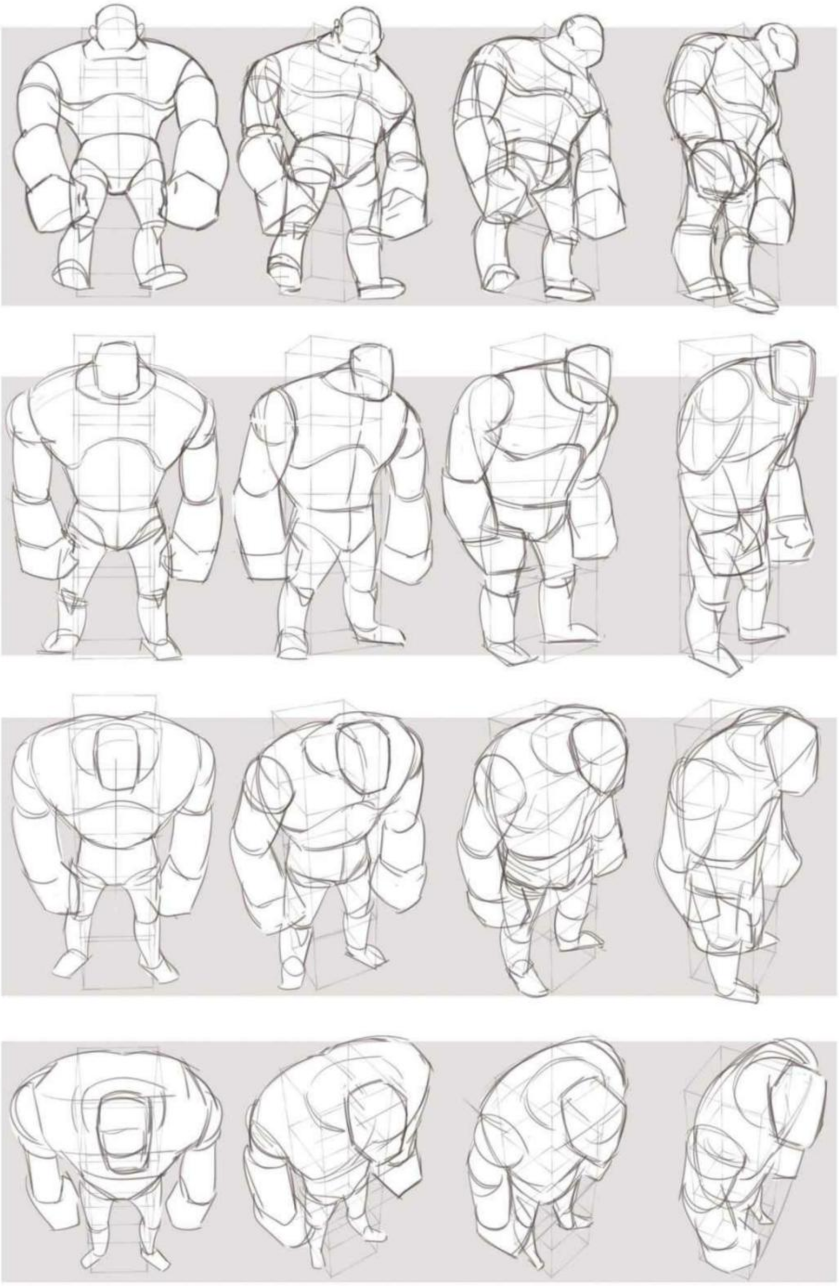
When drawing anime characters, the proportions of the human body can be adjusted. The previous example was based on normal proportions.

The following is a demonstration of human body proportions. Now, practice drawing anime human figures in different proportions.

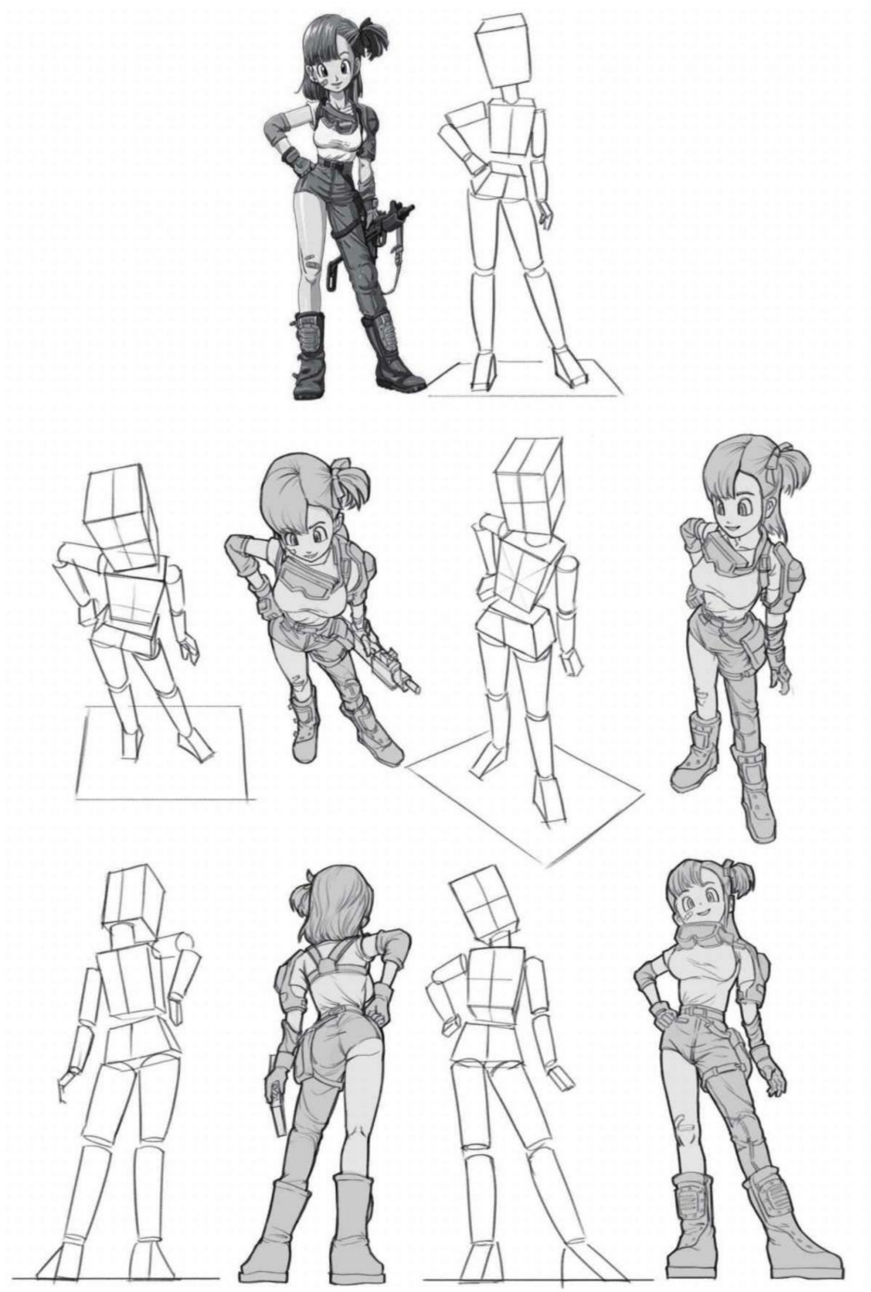






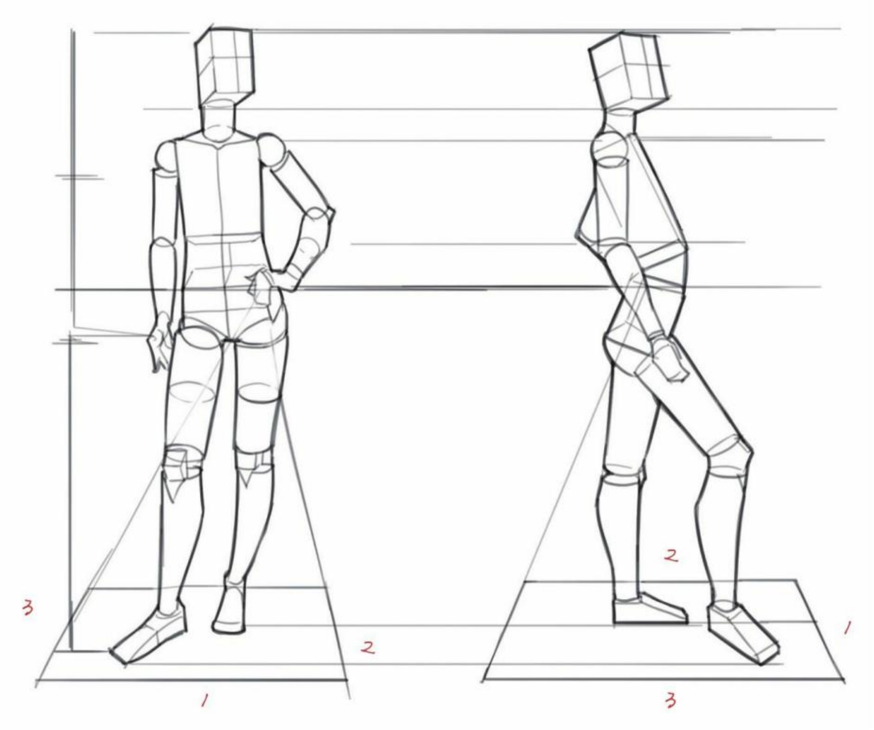


After mastering this method, you can try practicing with some familiar anime characters as references. First, analyze the human body's shape, then draw the human body from different angles, and add details to the character according to the setting.

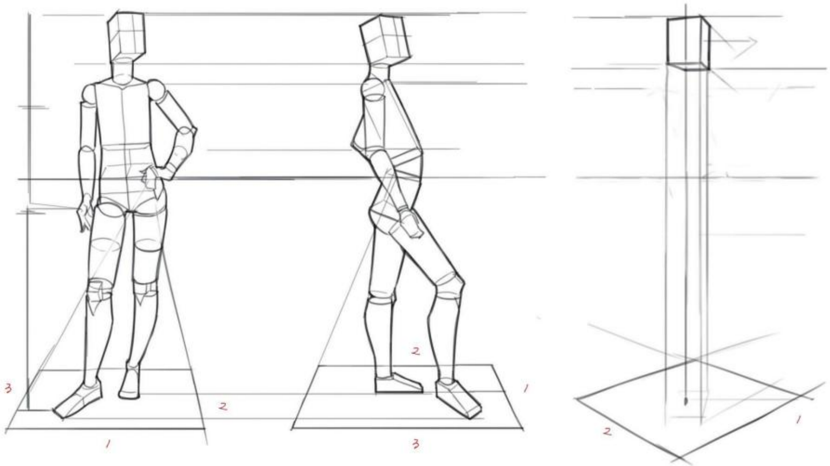


7.2.2 Human Body Mass Dynamics and Angles

Once you've mastered the proportions and spatial positioning of the human body, you can then practice drawing more complex human poses and angles. Start with simple standing poses. You can refer to photographs of the human body that show both frontal and side views. (If there is no side angle, then the side angle can only be drawn by drawing from the front).

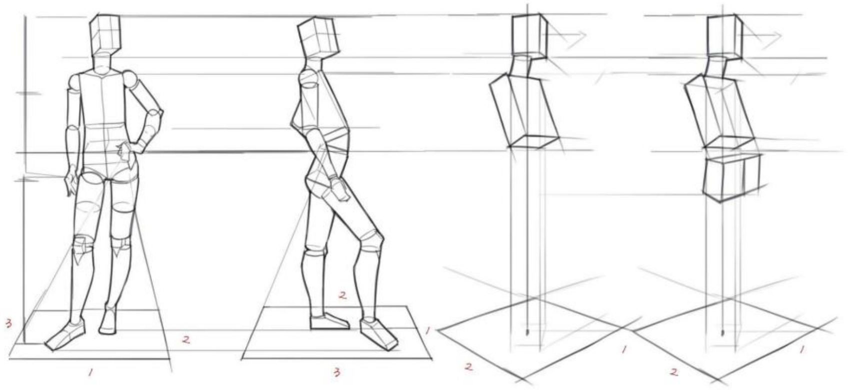


Analyze the human body in the photo, and make sure to mark the orientation of the ground beneath the body's feet. For example, the human torso is facing direction 1, and the face is facing between direction 1 and direction 2.

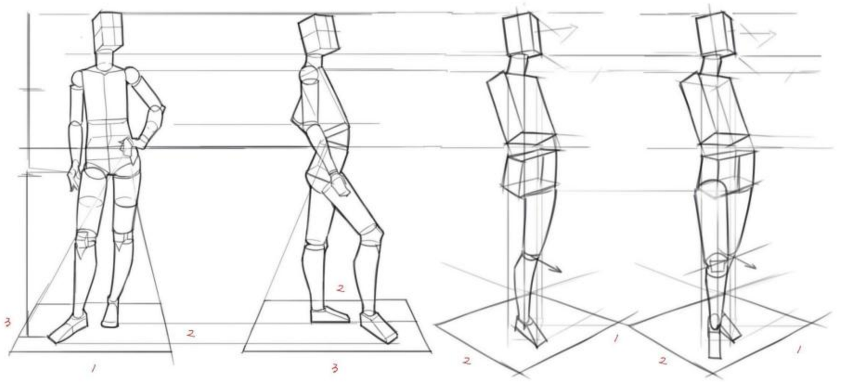


Draw the human form rotated 45° based on the front and side views of the human body. First, draw the ground, noting that the vanishing point of the ground falls on the horizon line at the waist. Second, draw the head. You can first draw a block representing the head on the ground, ensuring the face is facing between orientation 1 and orientation 2, then move the block upwards to the actual position of the head. Note that because the horizon line is not...

Similarly, after the head block moves upward, the block that is above the horizon should be able to see the bottom.



Next, draw the torso. Note the curves and orientation of the torso (direction 1).

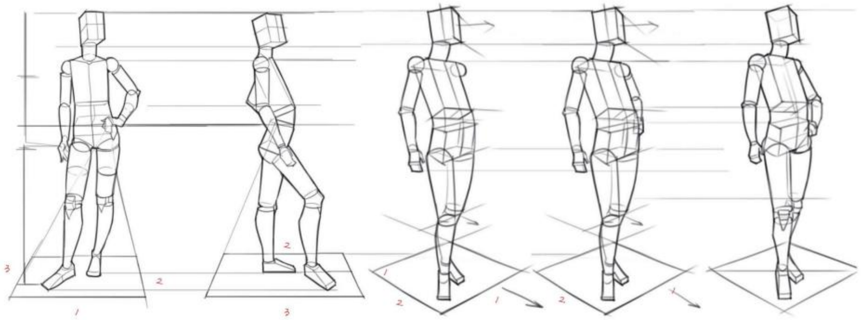


Finally, draw the legs and feet, and then the arms. First, calculate the position of the feet on the ground, then...

Then, draw the legs based on the connection between the thigh and the pelvis.

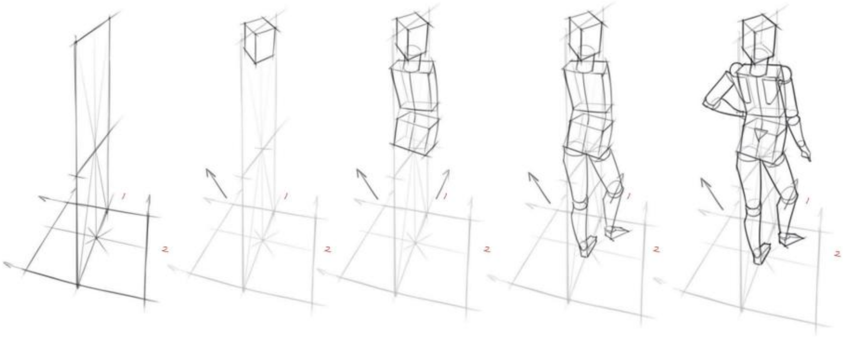
The side view shows that the arms are located behind the chest cavity, giving the impression of...

Just make it comfortable. Refine the lines and complete the drawing of the human body shape rotated 45° in parallel.

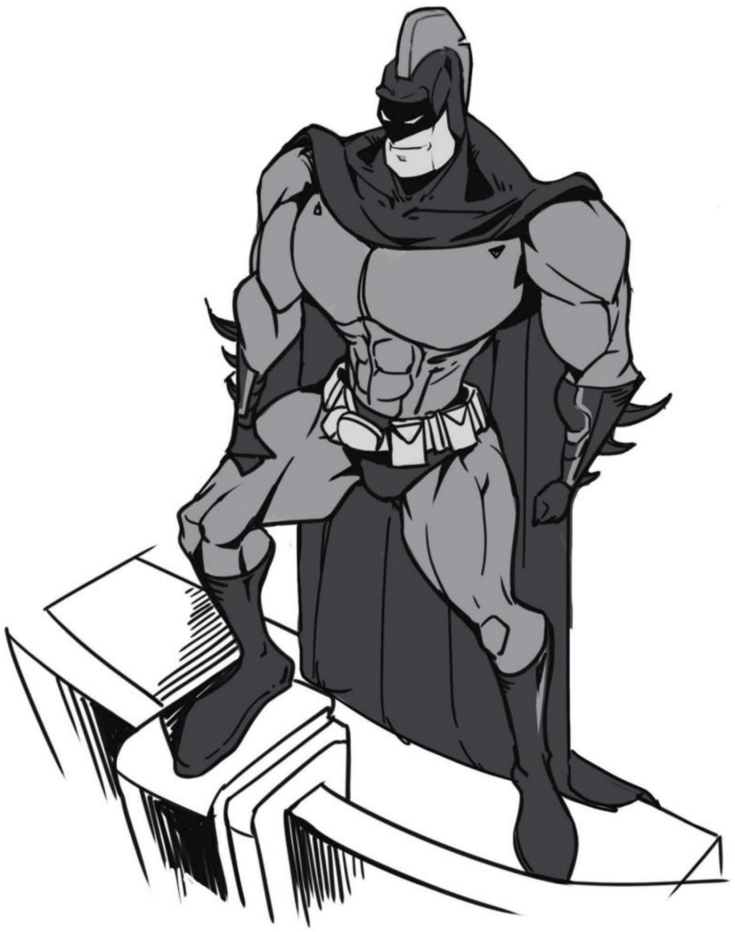


Following the steps above, draw the human figure from other angles. Draw from other angles.

When depicting the human form, pay attention to the perspective compression ratio of space.

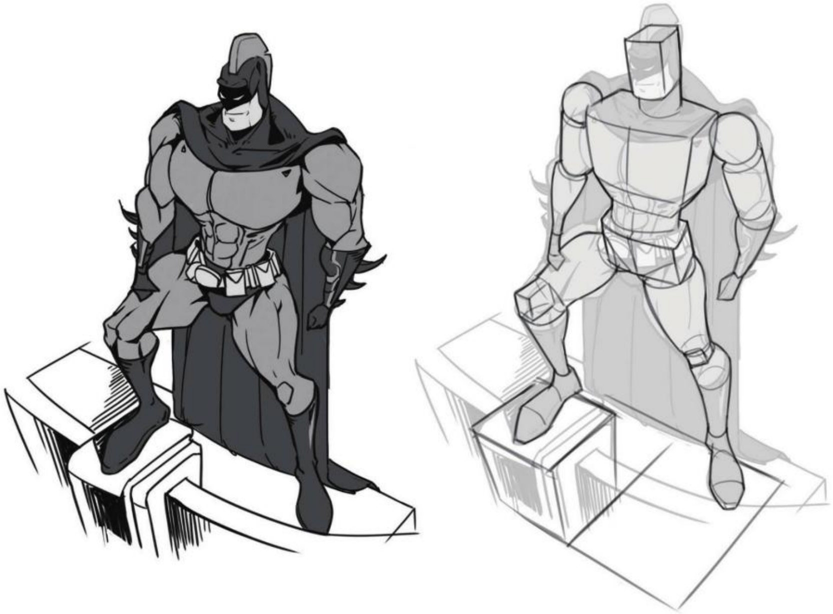


Taking the image below as an example, first determine a ground plane, then add a vertical plane (this vertical plane is determined according to the height of the person), and then determine the middle position in the vertical plane (the middle position represents the bottom of the human pelvis). This way, you won't make mistakes when representing the perspective effect.

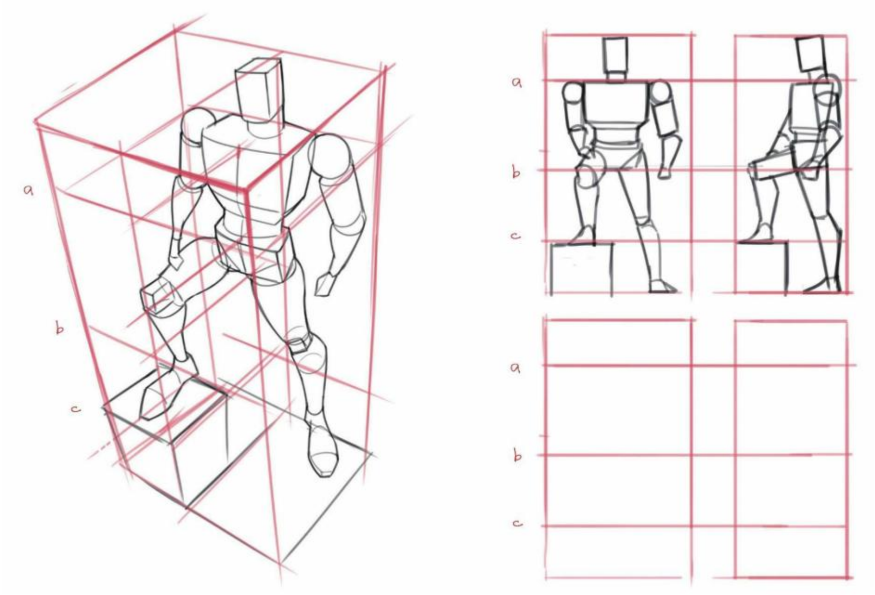


The above-mentioned method of calculating perspective can be used to analyze and draw various angles of figures in an illustration.

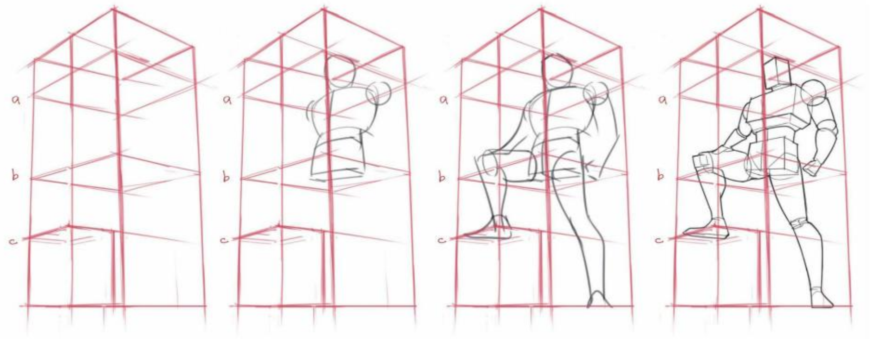
01. Analyze and draw the figure's body shape. You can summarize the figure's body shape based on its characteristics. The summarized body shape must be close to the original figure in the work. At the same time, you should try to summarize it as comprehensively as possible so that you can imagine and draw the shape from other angles when practicing.



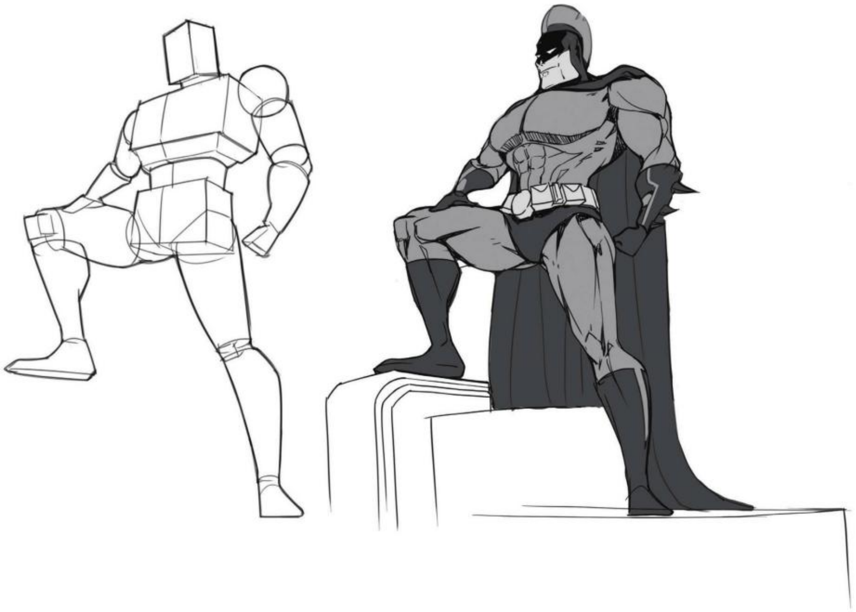
02 Use large cubes to outline the human body, analyze the proportions of the human body, and mark the location of the human body.



03. Transform the large, generalized blocks from different angles, paying attention to controlling the proportions of the blocks after the angle transformations. Then, determine the size, shape, and position of the human body blocks within the transformed blocks.



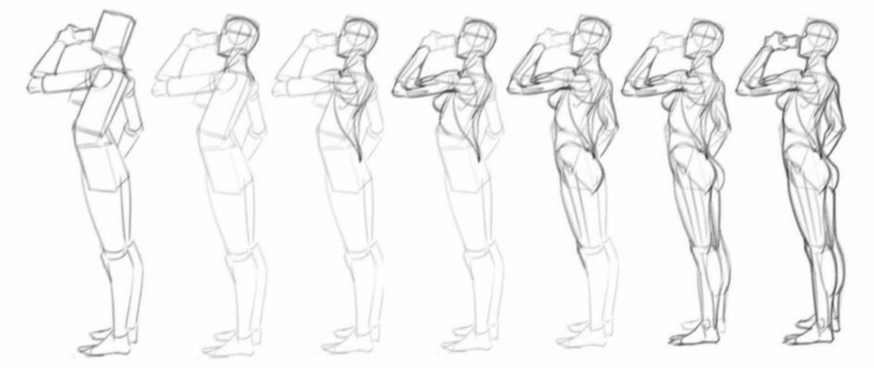
04. Refine the structure of the human and object blocks in the cube.



7.2.3 The Transformation from a Bulk-Body Man to a Muscular Man

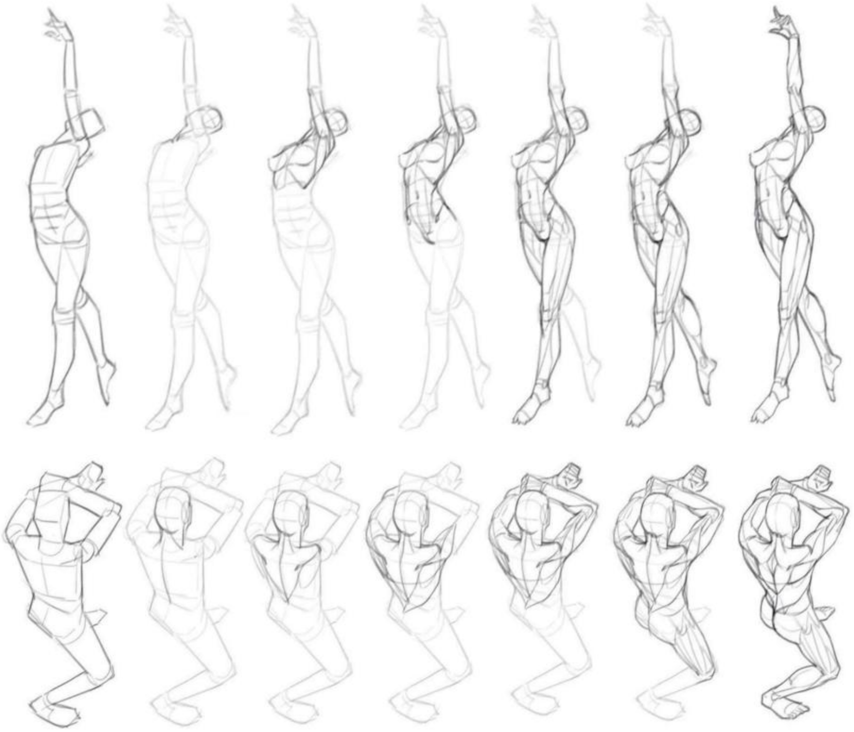
Based on the drawing methods for different parts of the human body from different angles as explained above, we can draw the square...

The human body becomes a more realistic human body.

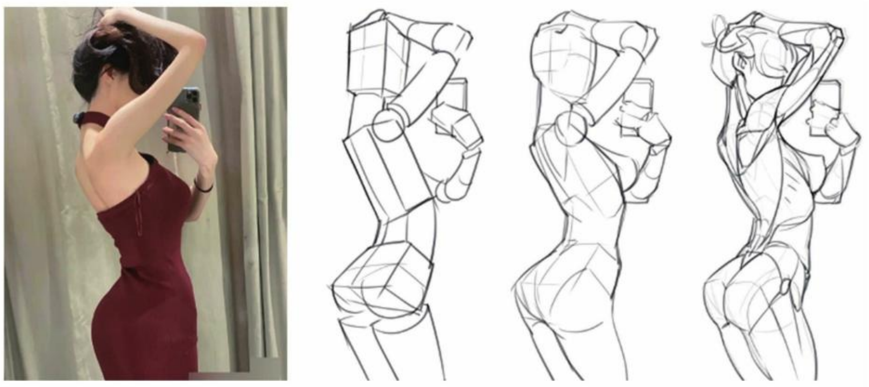


Based on body mass, muscles are added according to their connection points and shapes, starting from the head and working outwards.

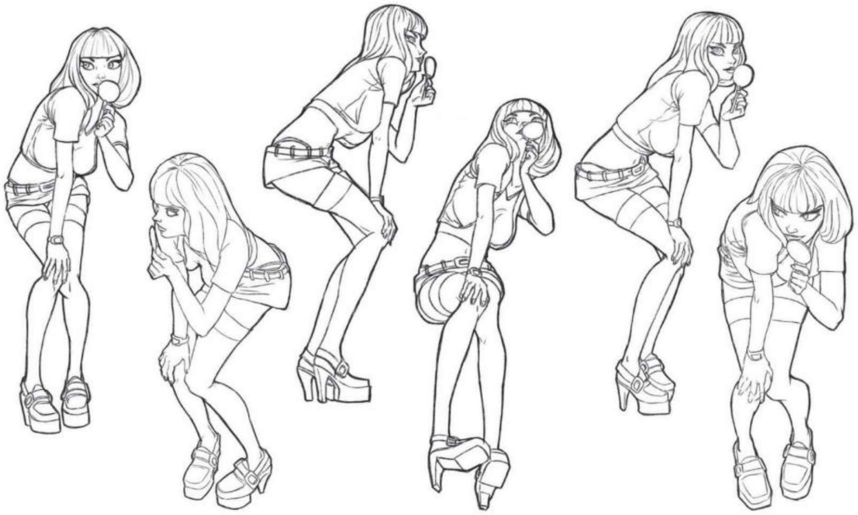
Draw the human body by pushing down.



If you can't think of what dynamic poses to practice drawing, you can refer to photos and draw the body shape and muscles of the people in the photos based on their movements.



Building upon the previous angle-shifting exercises, we can conduct group exercises analyzing human body dynamics. Here, we choose to refer to the dynamic pose of a person in a photograph or an anime character, and then deduce its form from different angles.



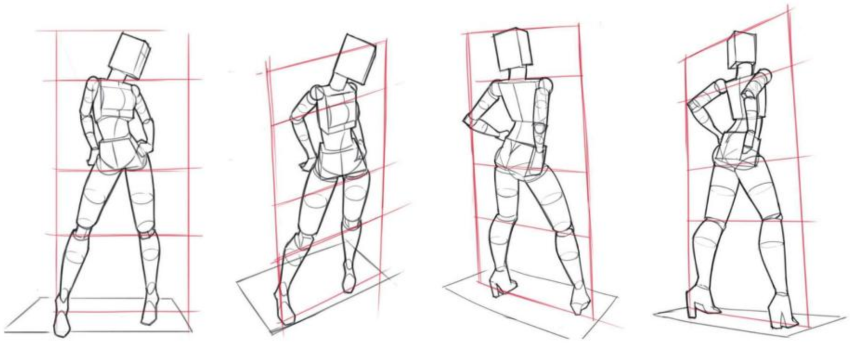
hint

In the early stages, you can analyze anime figures from multiple angles, combining the drawing with the analysis of the actual objects. You can start by drawing three relatively easy human figures that are translated and rotated, and then draw three more difficult human figures that are viewed from above or below.

After gaining the above drawing experience, you can then analyze photographs. The specific analysis process is as follows:

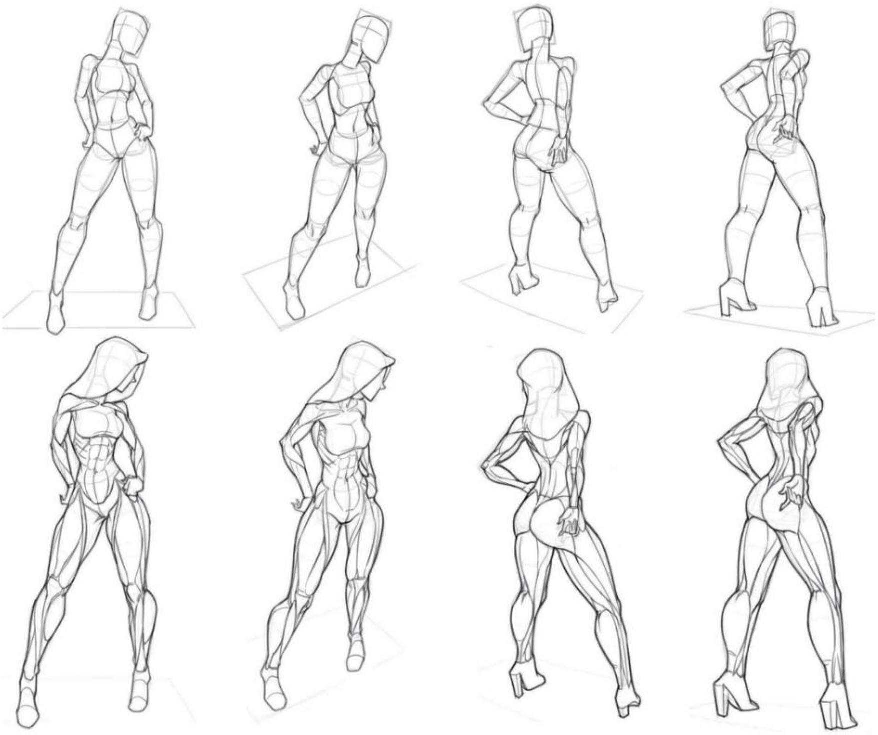
Down.

First, draw a relatively smooth human body structure based on the volume blocks. This step mainly considers whether the lines are smooth and whether the perspective of the volume blocks is accurate, and whether the two are consistent.

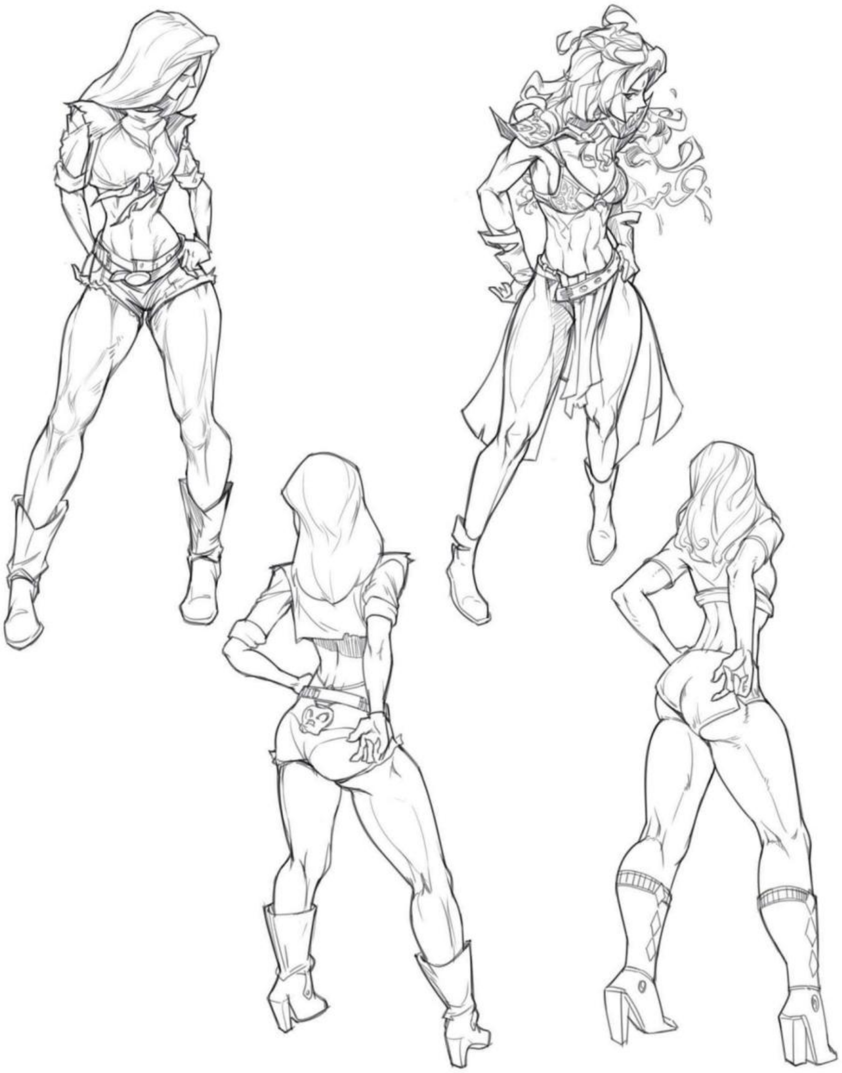


Secondly, analyze the human body based on correct perspective relationships and smooth lines.

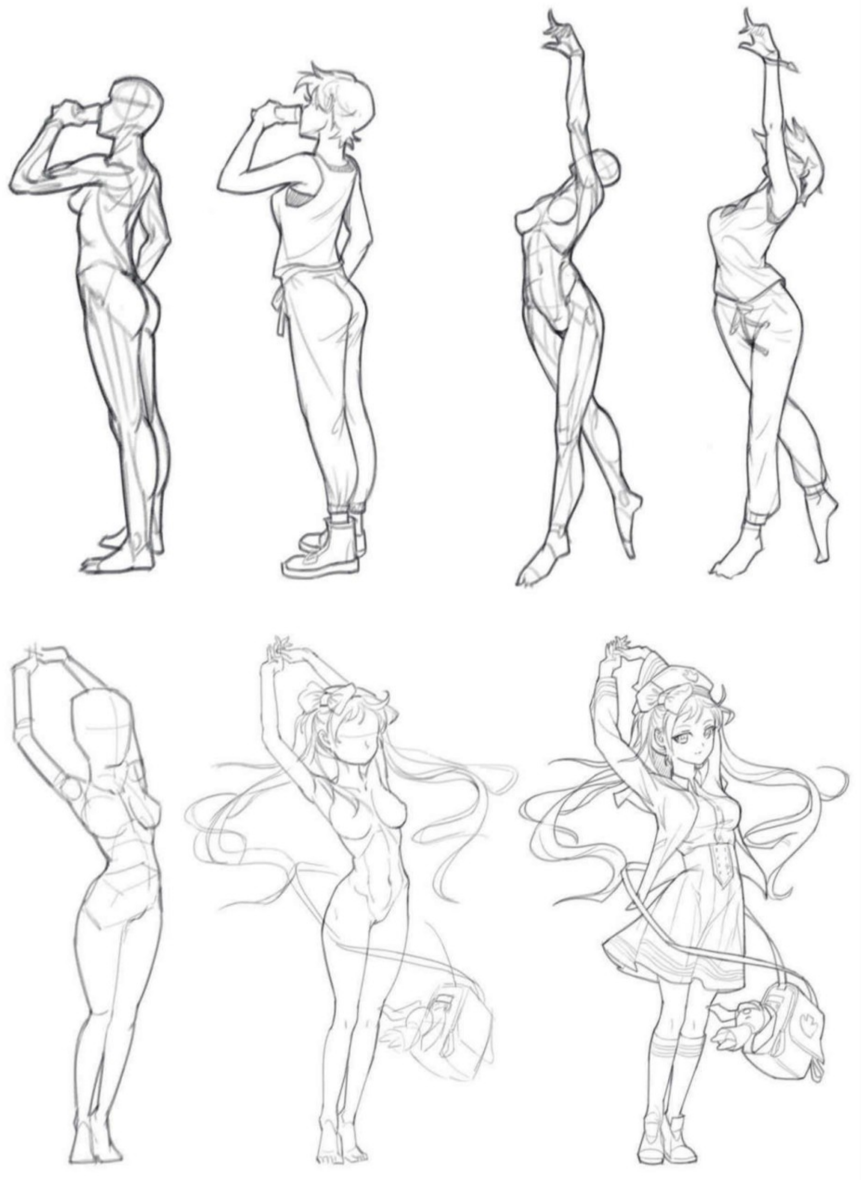
Add muscles from head to toe according to their interrelationships to draw the entire human body.



Finally, selectively refine the muscles and add other details as needed. Humans with muscles appear more realistic, so learning how to depict muscles is essential. Note that when drawing the human body, the depiction of muscles should be moderate; it's not necessary to draw them all.

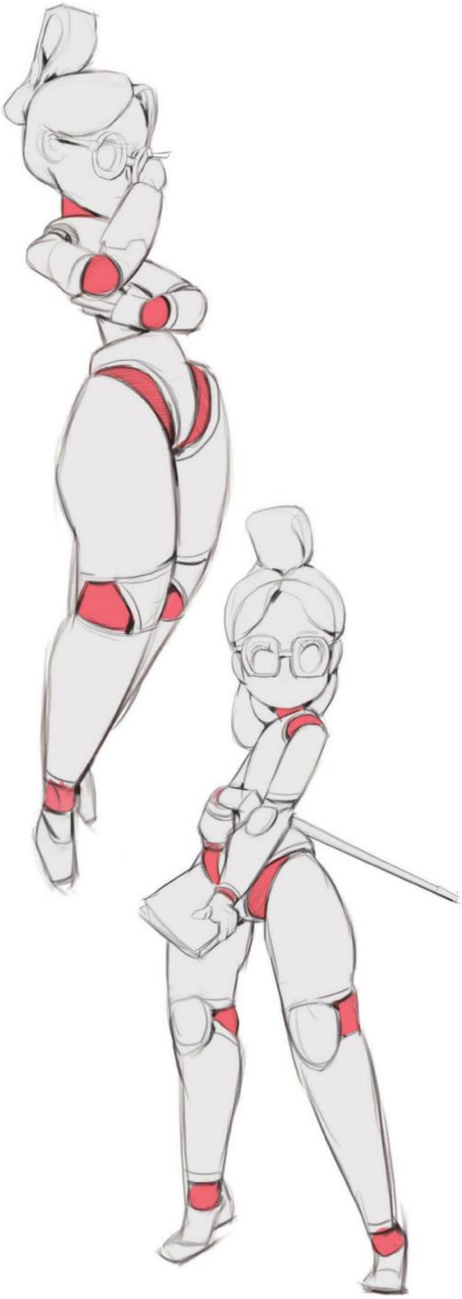


Depending on the painting style, the level of detail in depicting human muscles can be flexibly adjusted.



7.3 Basic Manifestations of Human Dynamics

Various dynamic poses are a key focus when drawing, as they can reveal a character's temperament and personality. When done well, they can enhance the tension and expressiveness of the artwork. Many people understand human anatomy but don't know how to represent human movement. This section breaks down the human body to analyze the expression of dynamic movement.



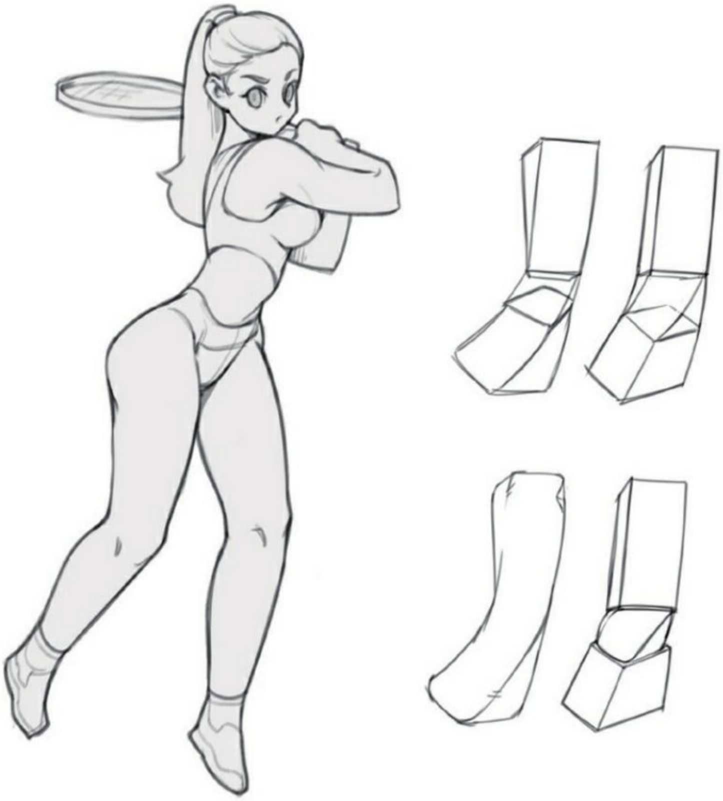
7.3.1 The Dynamic Core: "Twisting of the Torso"

The most difficult aspect of human anatomy to capture is the twisting of the torso; this is often the easiest way to draw a stiff or lifeless figure.

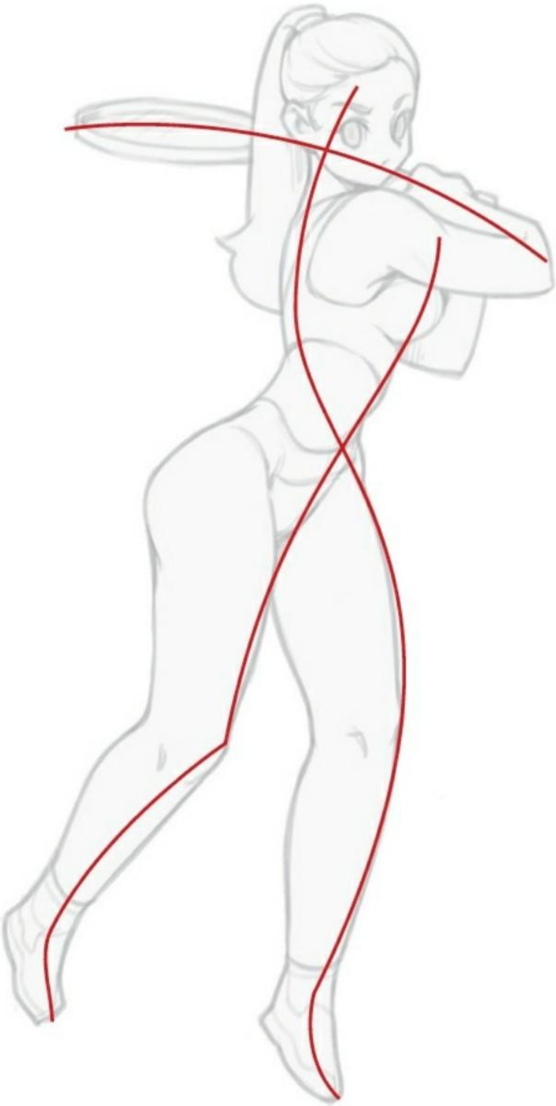
The place is the torso.

We can think of the torso as an eraser, or as two blocks with a piece in between.

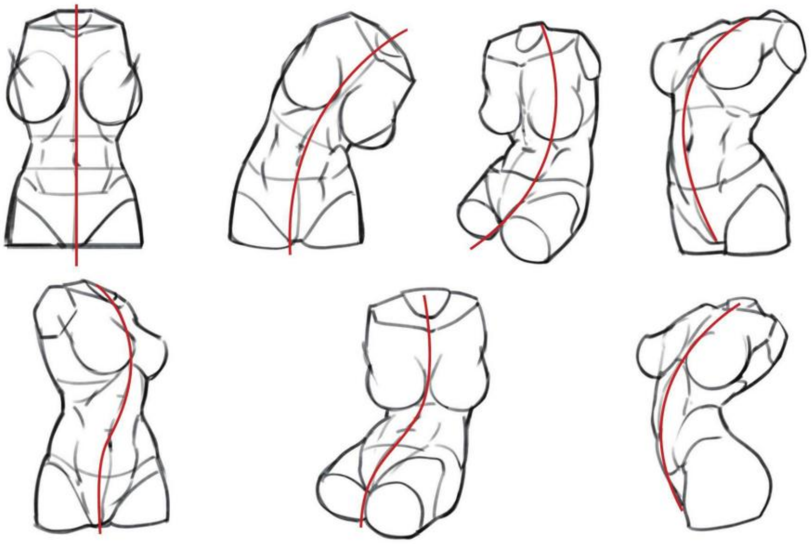
An eraser, and this eraser can be twisted freely. When practicing, avoid drawing the torso too stiffly, or having the upper and lower body blocks face the same direction.



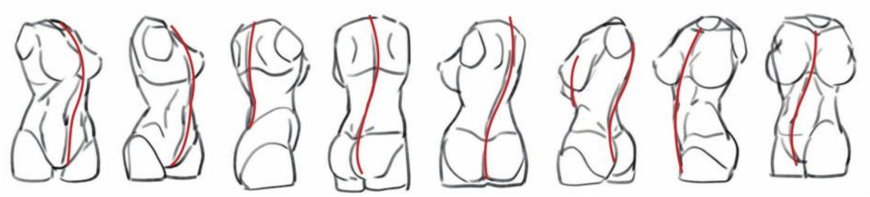
The dynamic line of the human body runs through the torso, generally passing through the spine on the back or the midline on the front. To determine whether the dynamic line is the most important one, you need to see if it runs from the head to the feet.



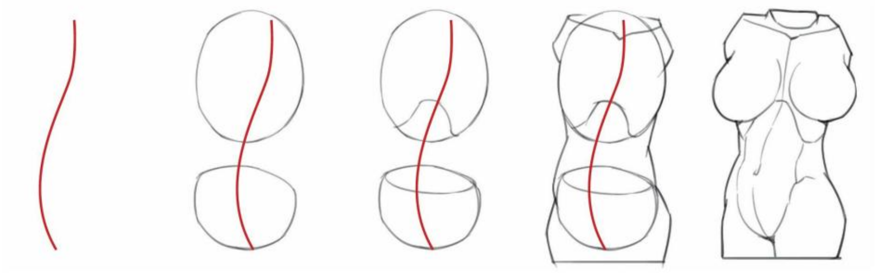
Many people think that dynamic lines are two-dimensional, but they are not. Dynamic lines can be placed in space. Using different twisting states of the torso as a reference, the torso at different angles can be drawn according to the position of the dynamic lines in space.



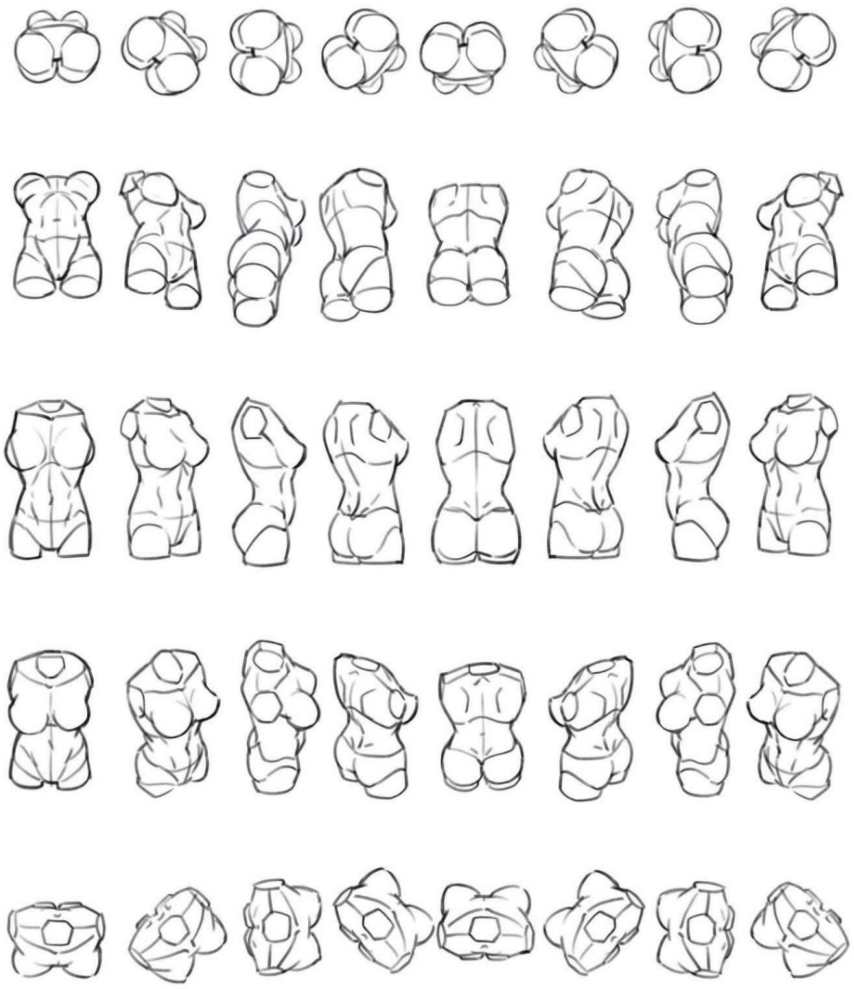
For a torso that can be seen from both the front and back, two dynamic lines can be drawn to represent it.

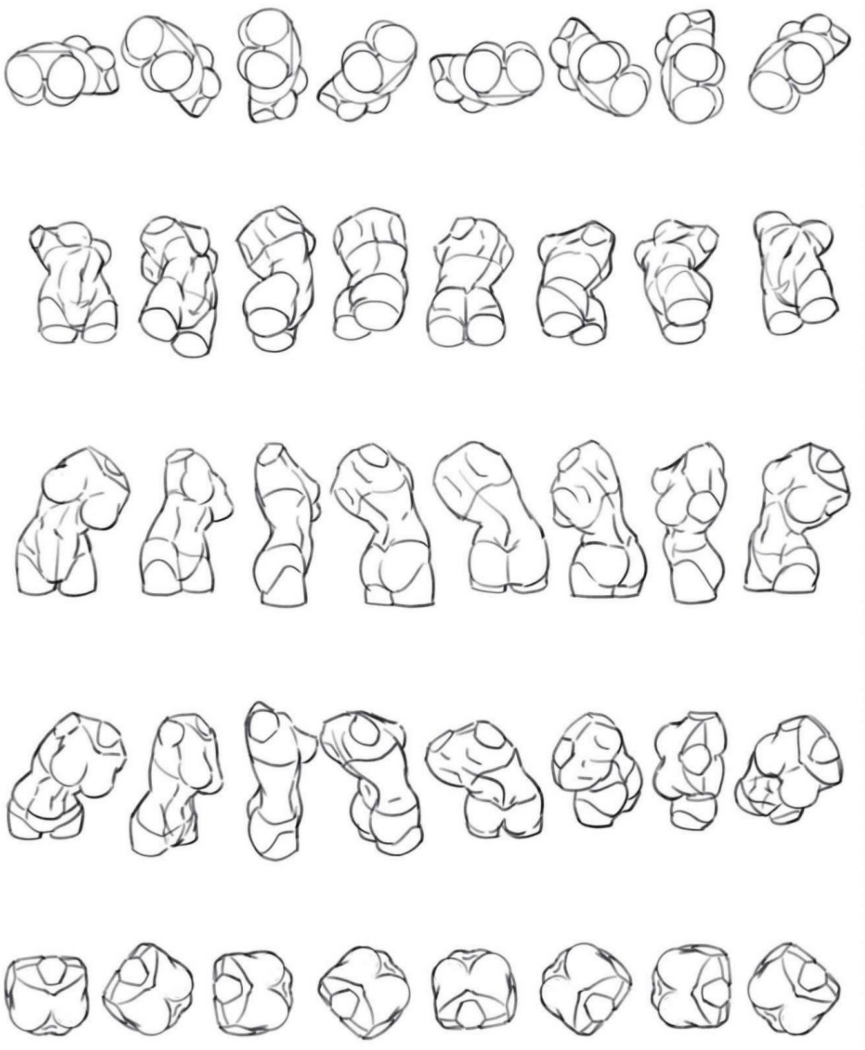


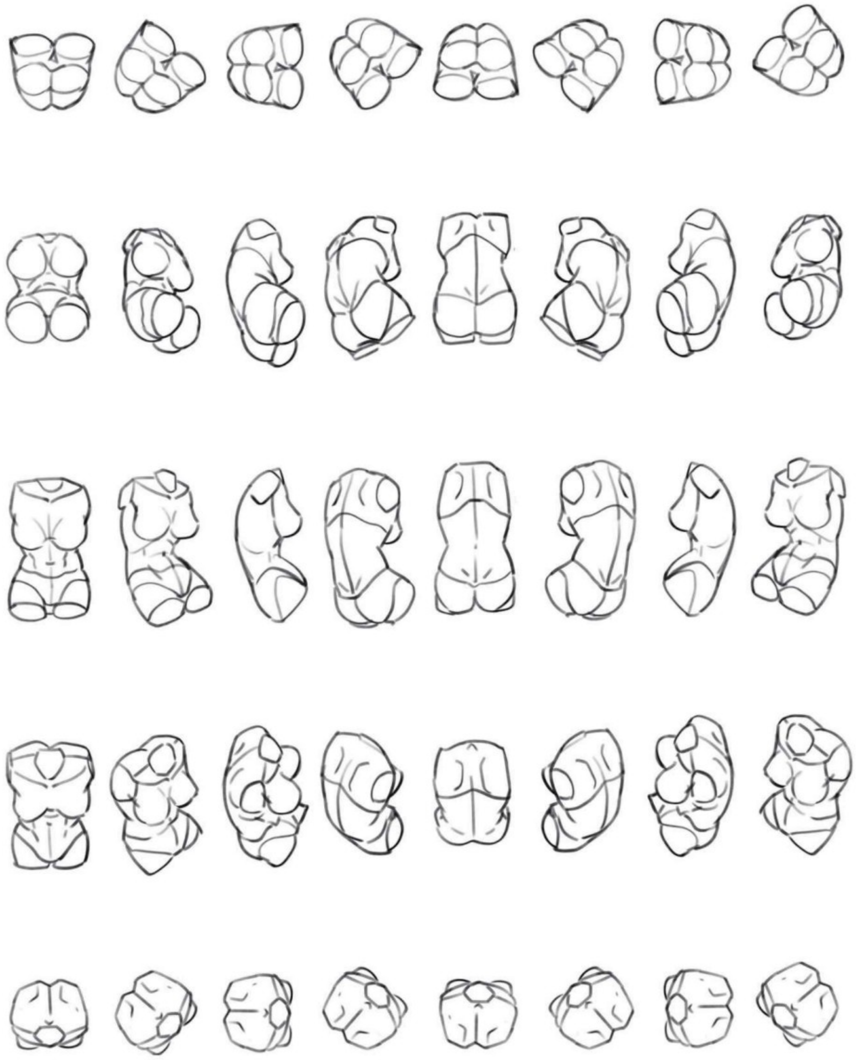
During practice, you can connect the human body blocks according to the length ratio and curvature changes of the dynamic lines, draw the torso at different angles, and deepen your understanding of dynamic lines by showing the twisting shape of the torso.

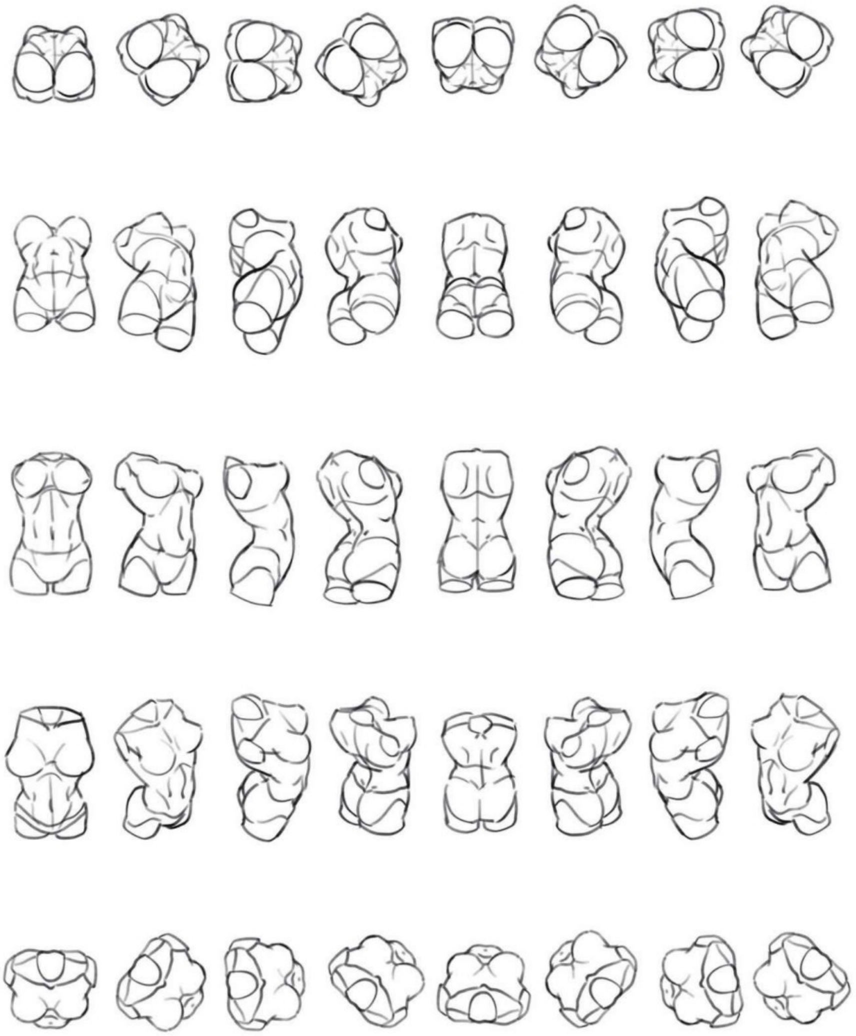


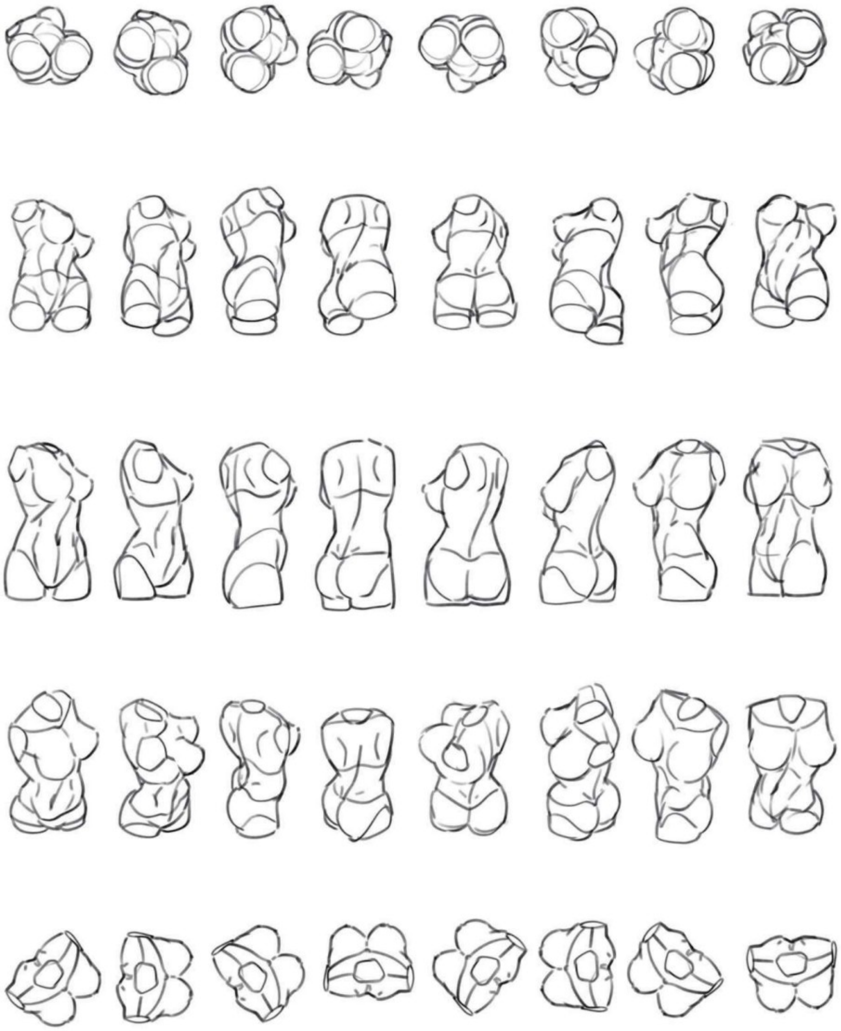
Dynamic representation of torso twisting from different angles.

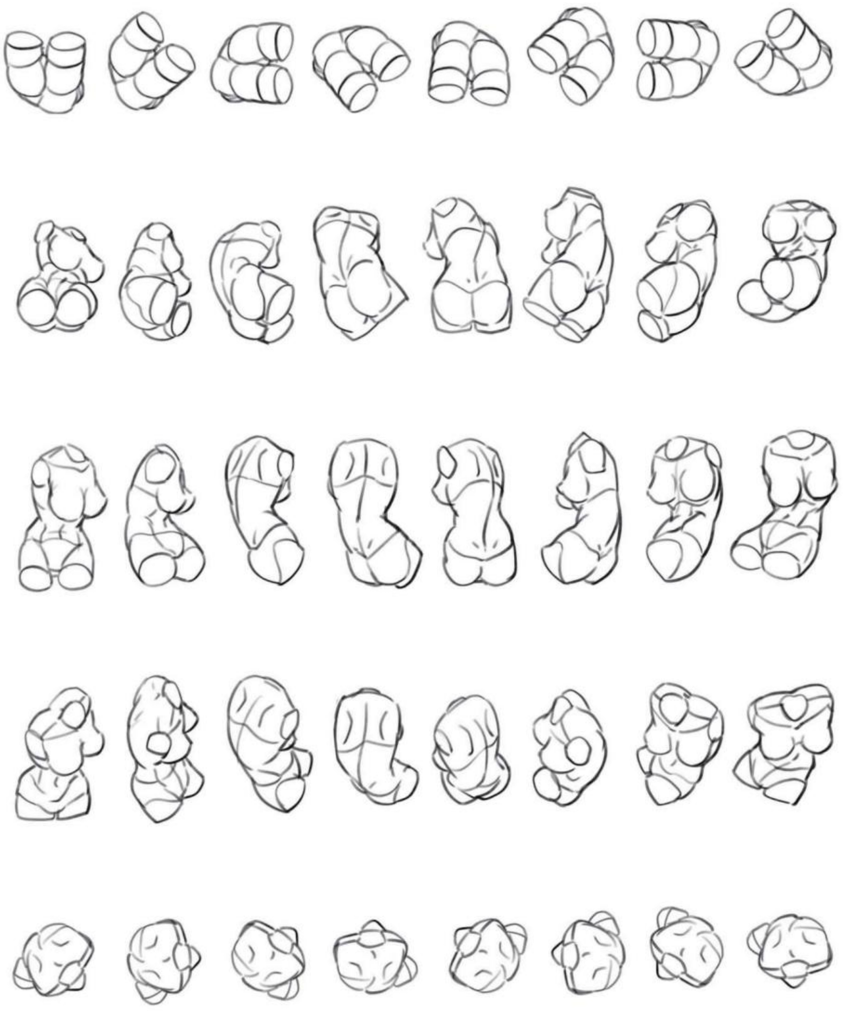






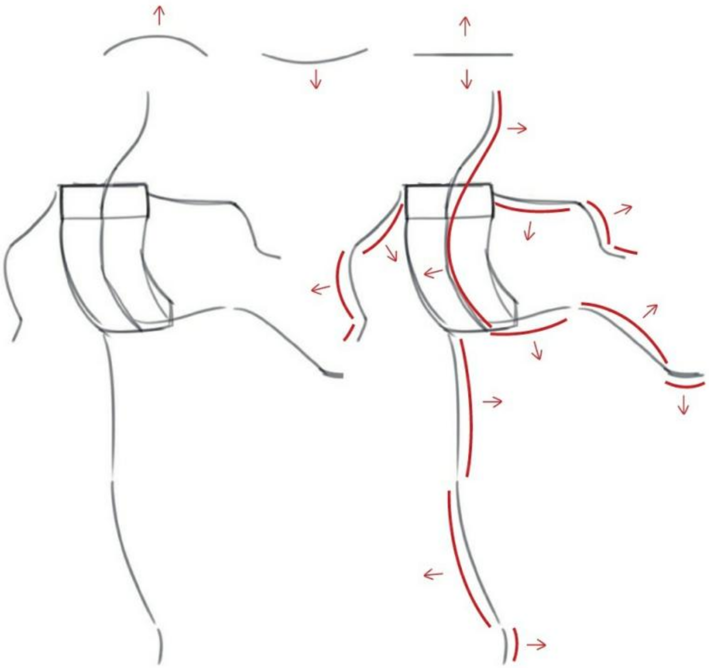






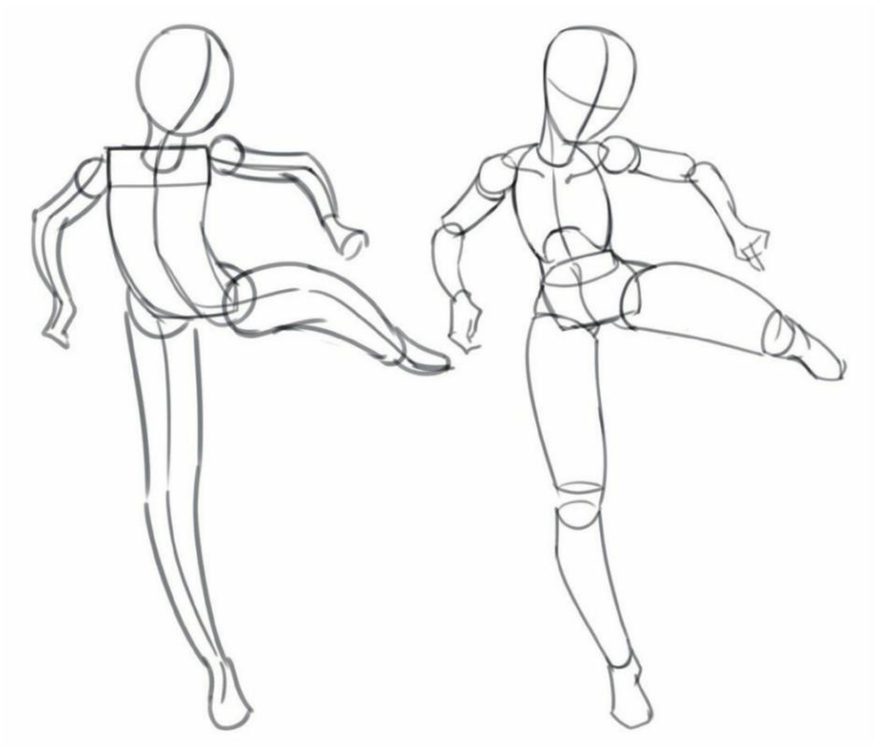
7.3.2 The Influence of Limb and Head Twisting on Human Dynamics

With the dynamic movement of the torso as the main element, and the coordination of the twisting of the limbs and head, one can draw a beautiful human body dynamic.

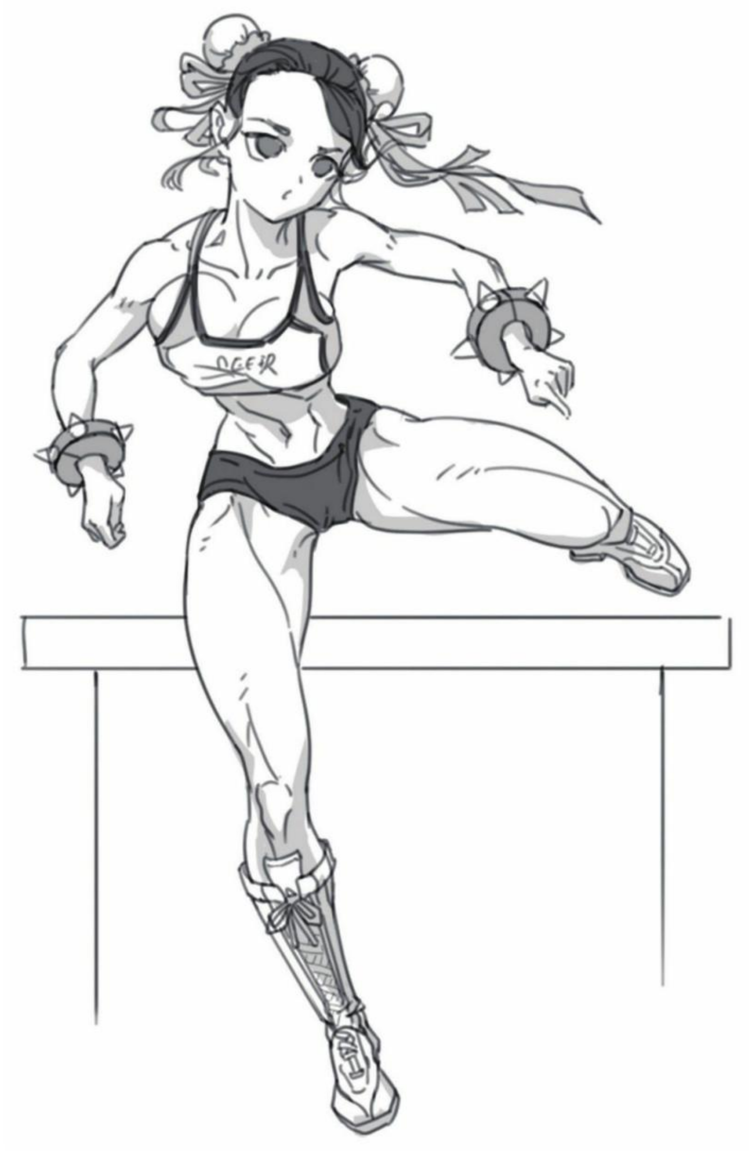


To give human body movements a sense of rhythm, you can use positive and negative arcs and straight lines to summarize the human body structure.

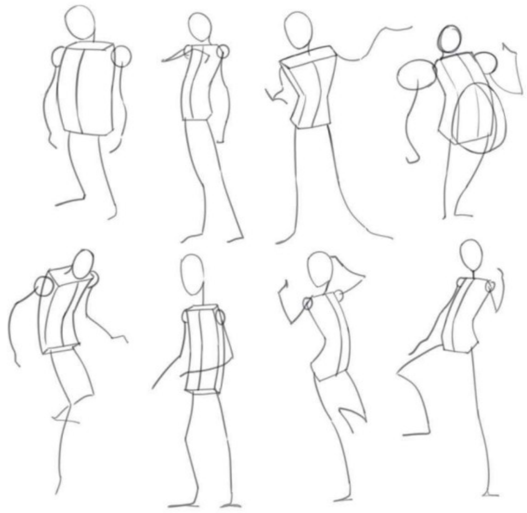
Structure.

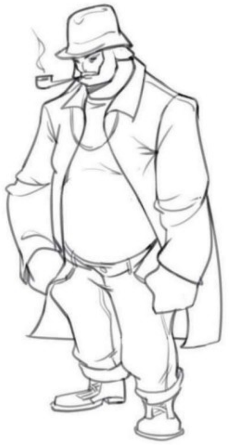


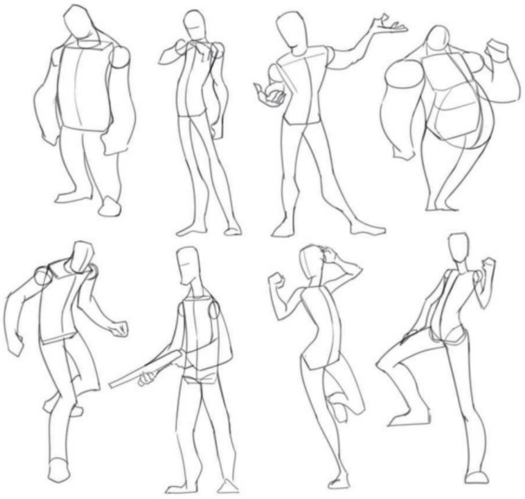
Use dynamic lines as a guide to draw the human body structure, and then further refine the figure's form within that structure.

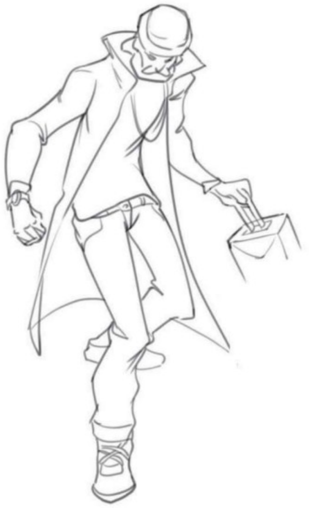


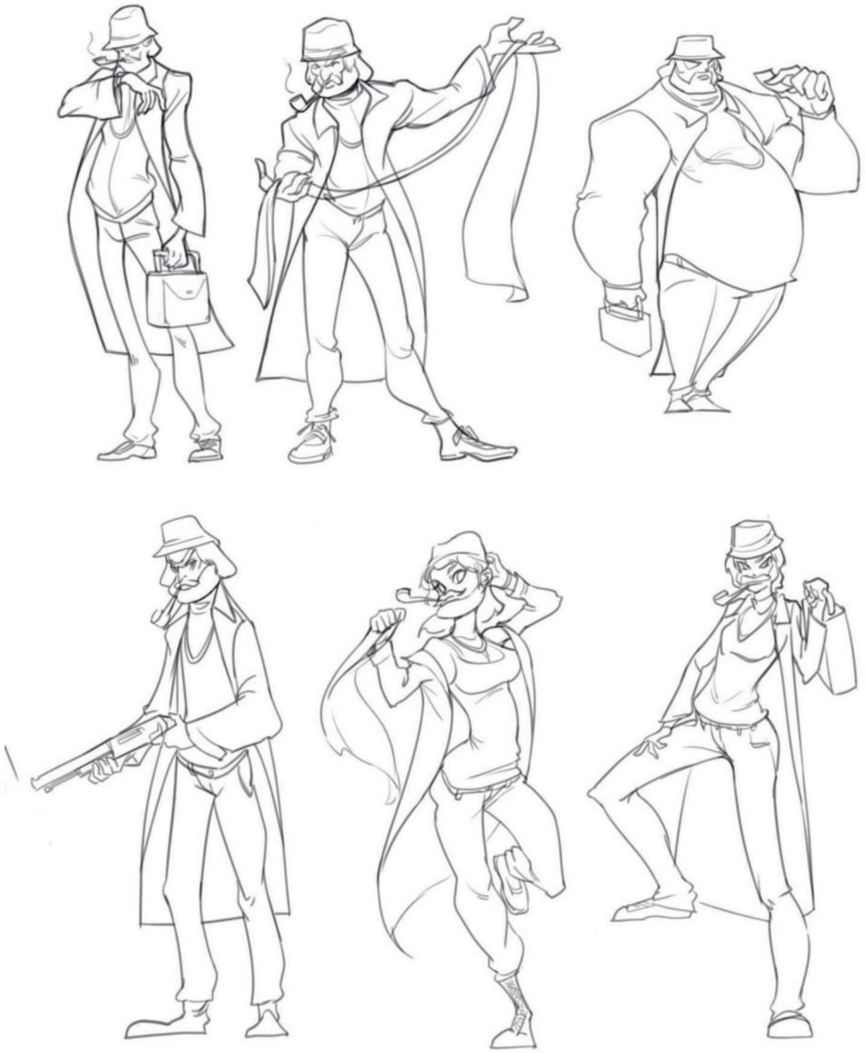
Dynamic lines can change according to the proportions of the blocks, allowing you to draw interesting figures with various proportions by analogy.





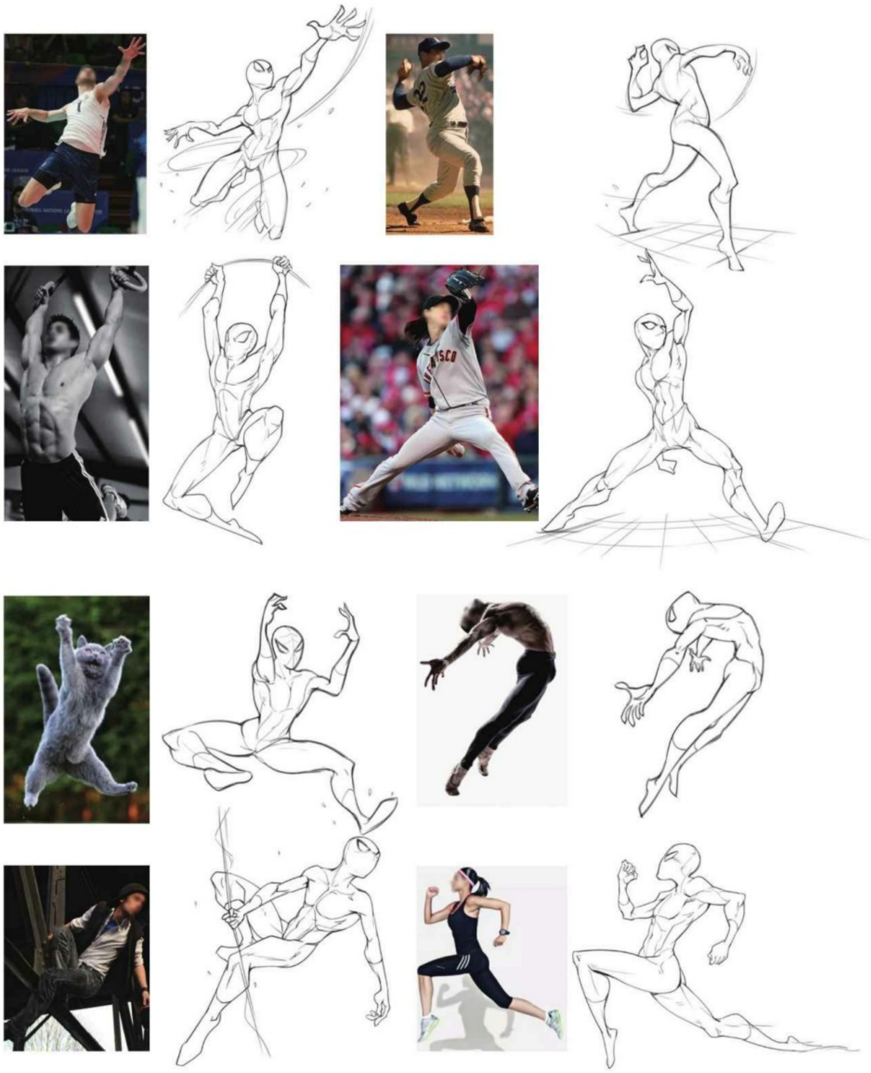


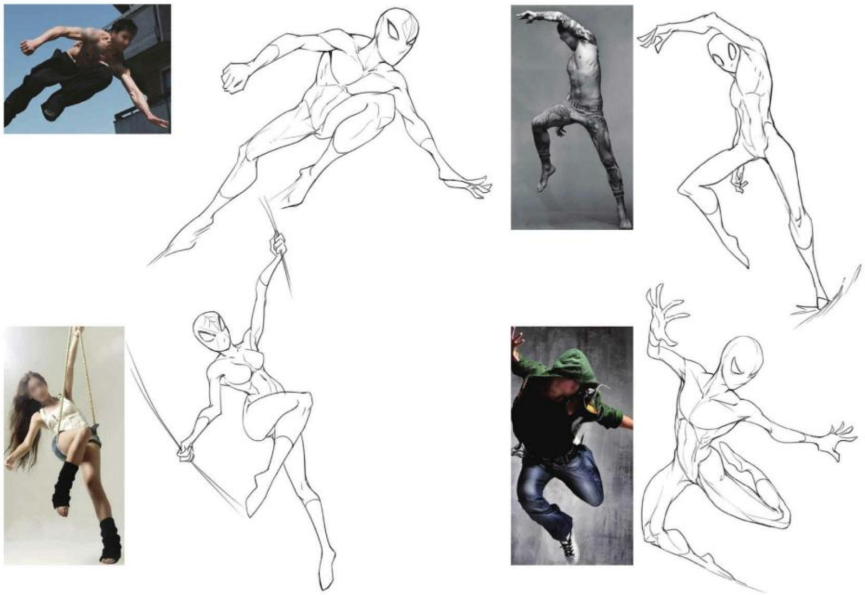


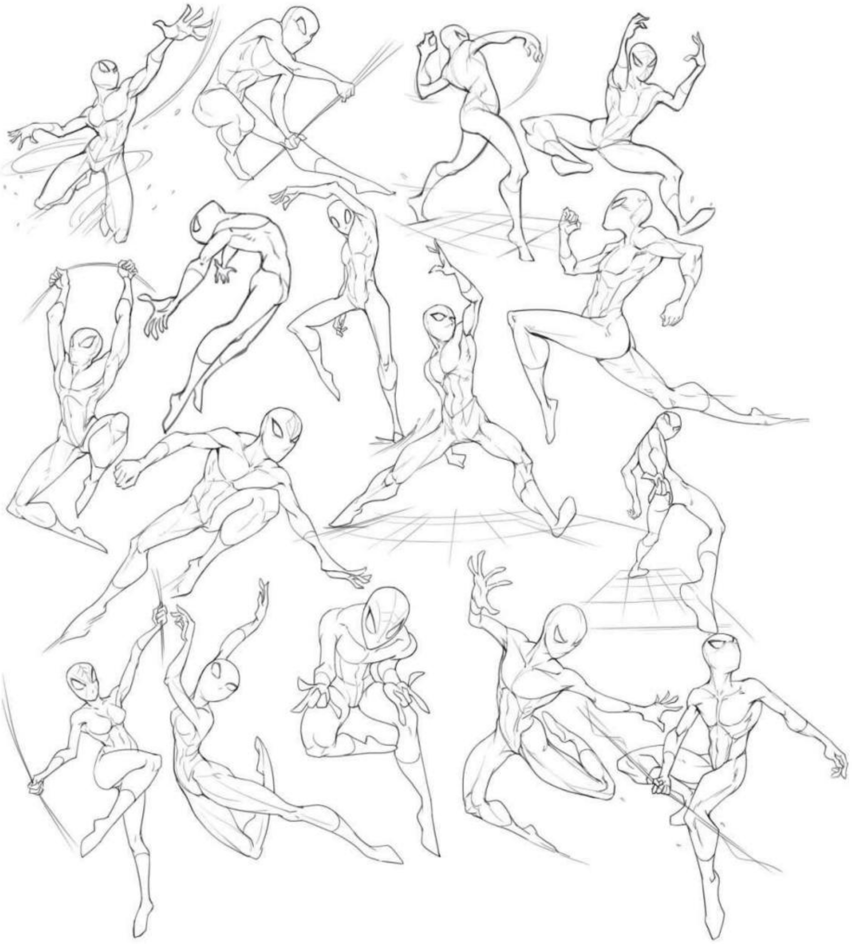


Exaggerate and distort the movements of the people in the photo to create a smooth, American cartoon-like style.

Human body dynamics.

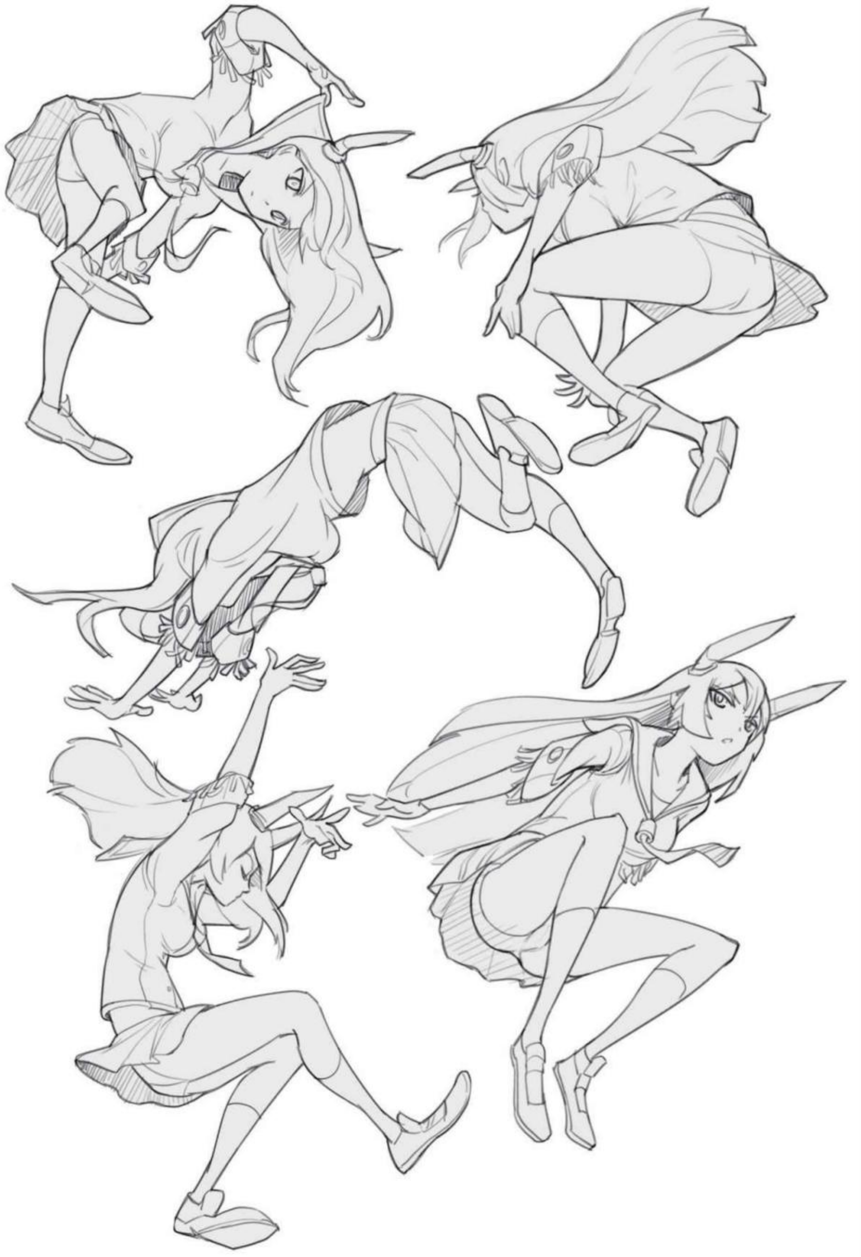


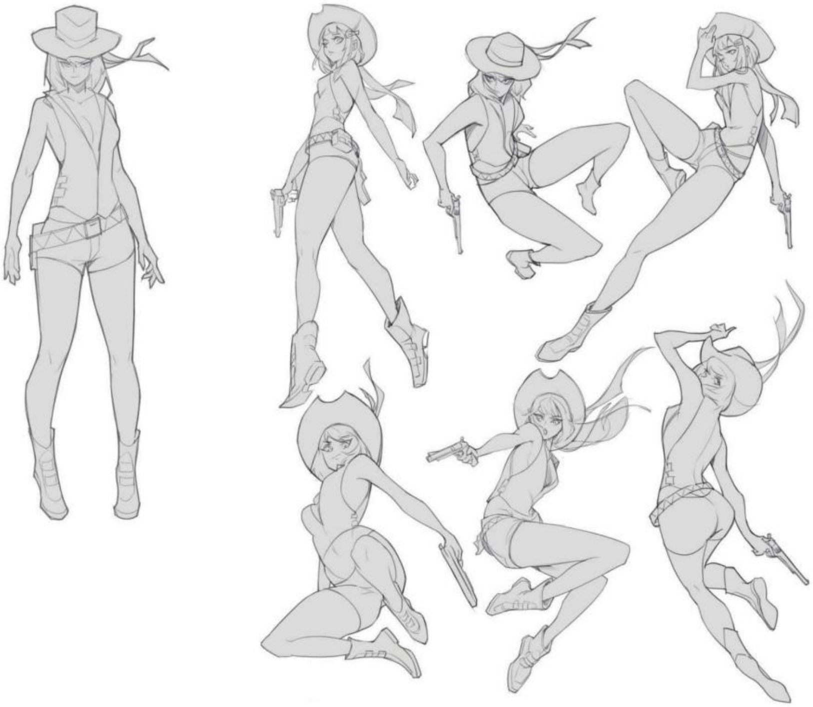




By combining the design features of American and Japanese anime characters, one can create...

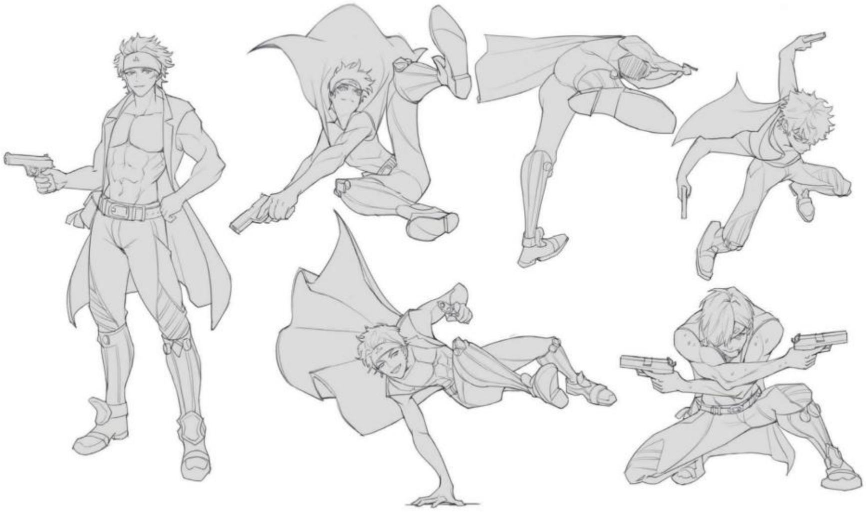
More interesting character designs.





hint

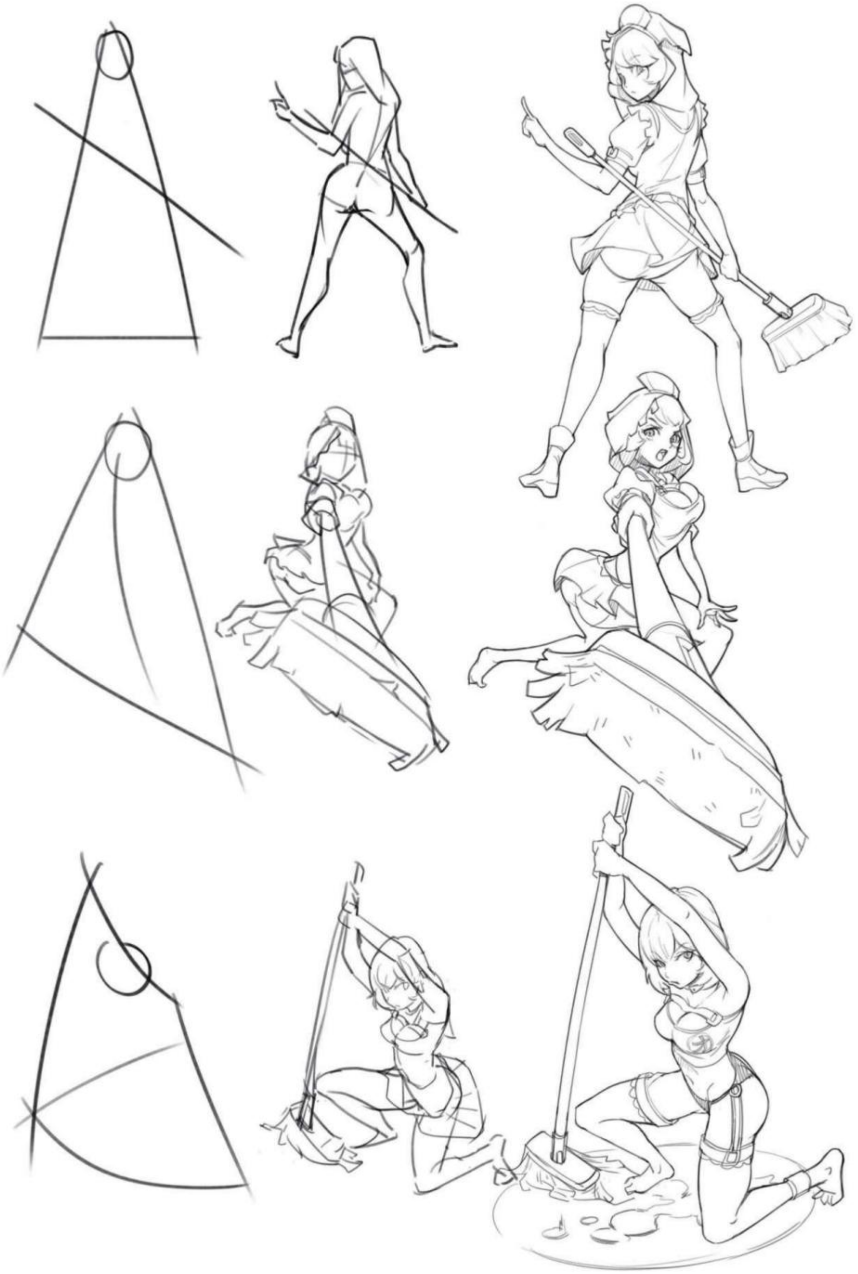
The dynamic lines of the character's limbs and torso need to be simplified and omitted to make the connection between the limbs and torso smoother and more natural.



7.3.3 Combination of Dynamic Lines and Graphics

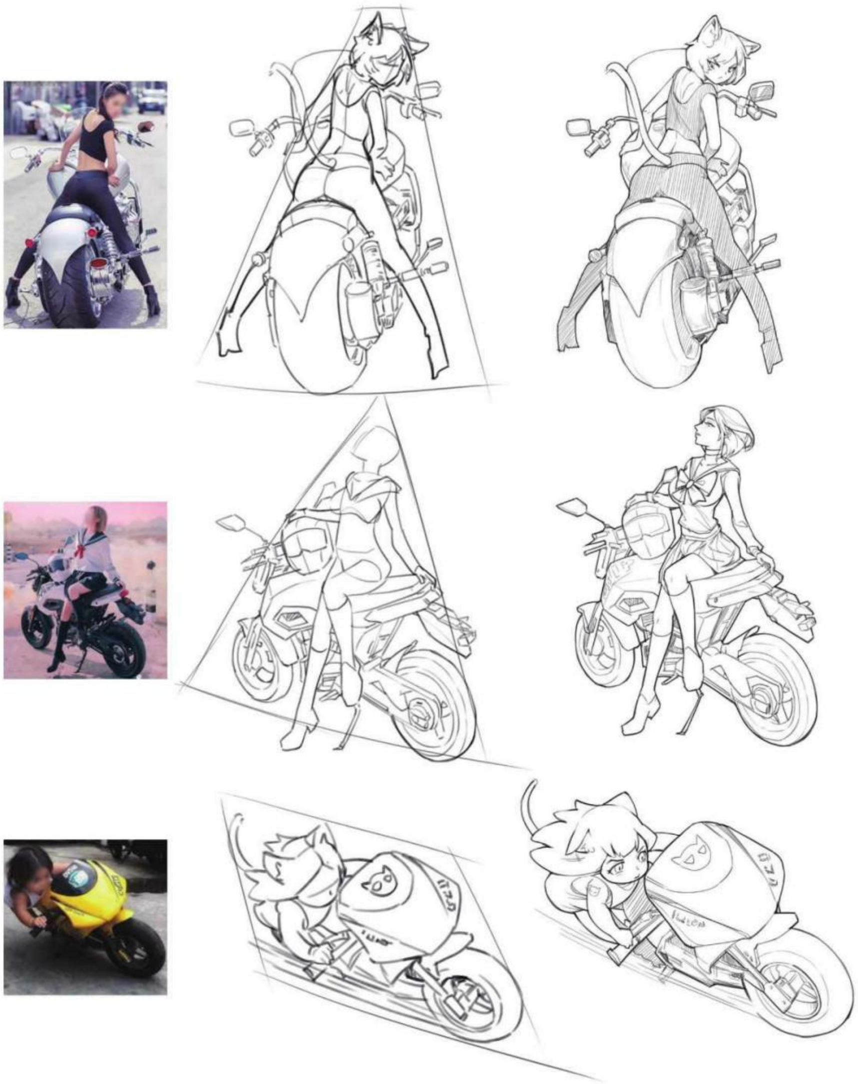
By combining human body dynamics with dynamic lines and graphics to summarize them, the image can look more...

It enhances the overall design and gives it a more formal feel.

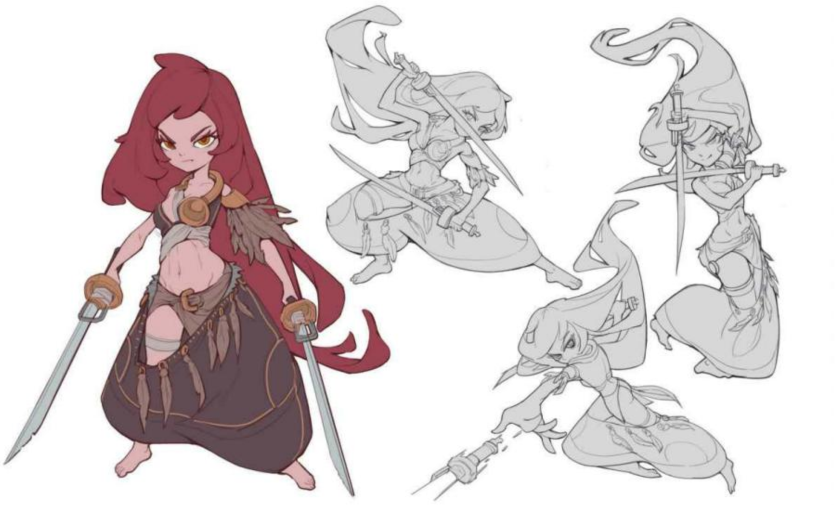


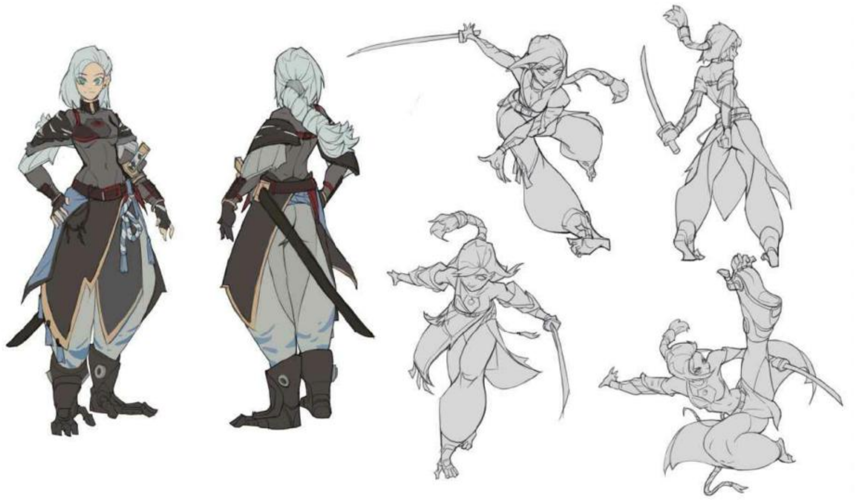
When practicing drawing human figures in motion, if you are unsure how to compose the image, you can refer to some forms of reference.

Strong photos, such as those with an overall triangular, rectangular, or parallelogram composition.



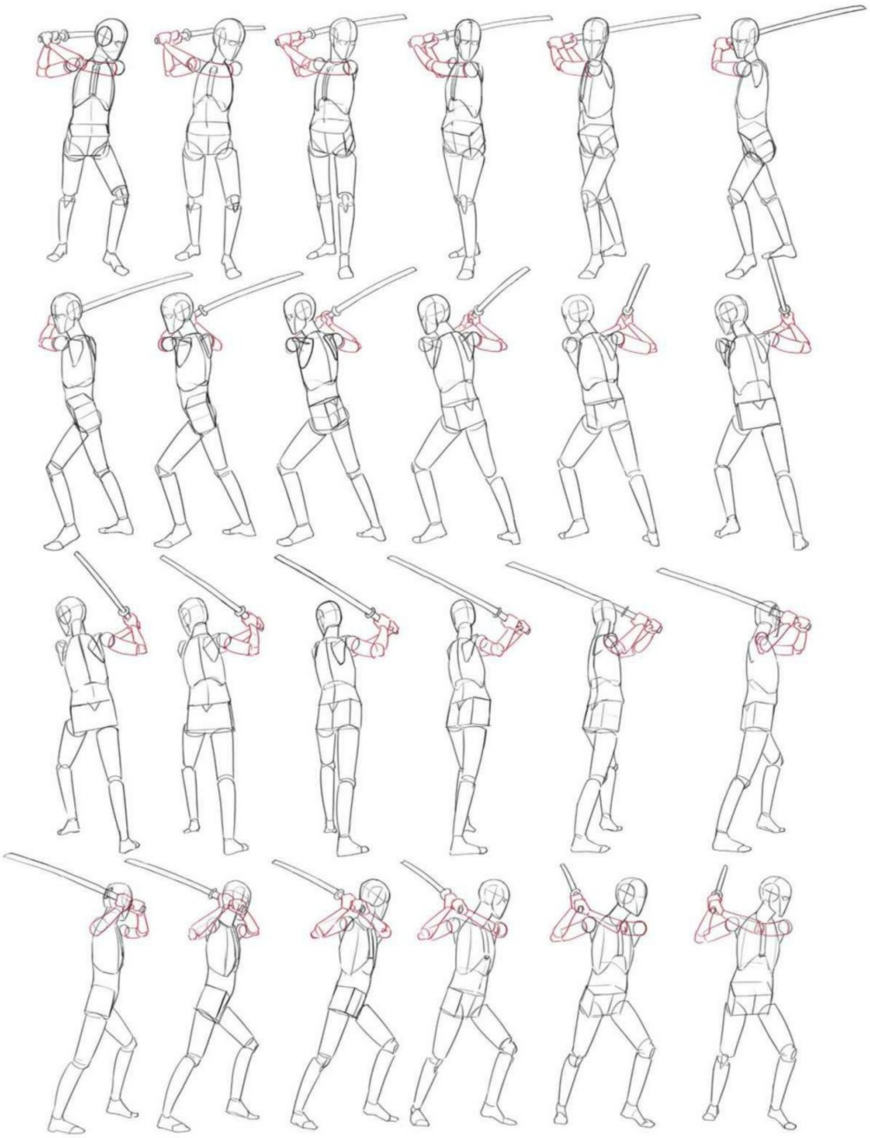
Simplifying the human body into a graphic representation makes the drawn figure more recognizable and leaves a deeper impression. In daily practice, it's important to combine graphic representations with dynamic lines to summarize the human body's structure.

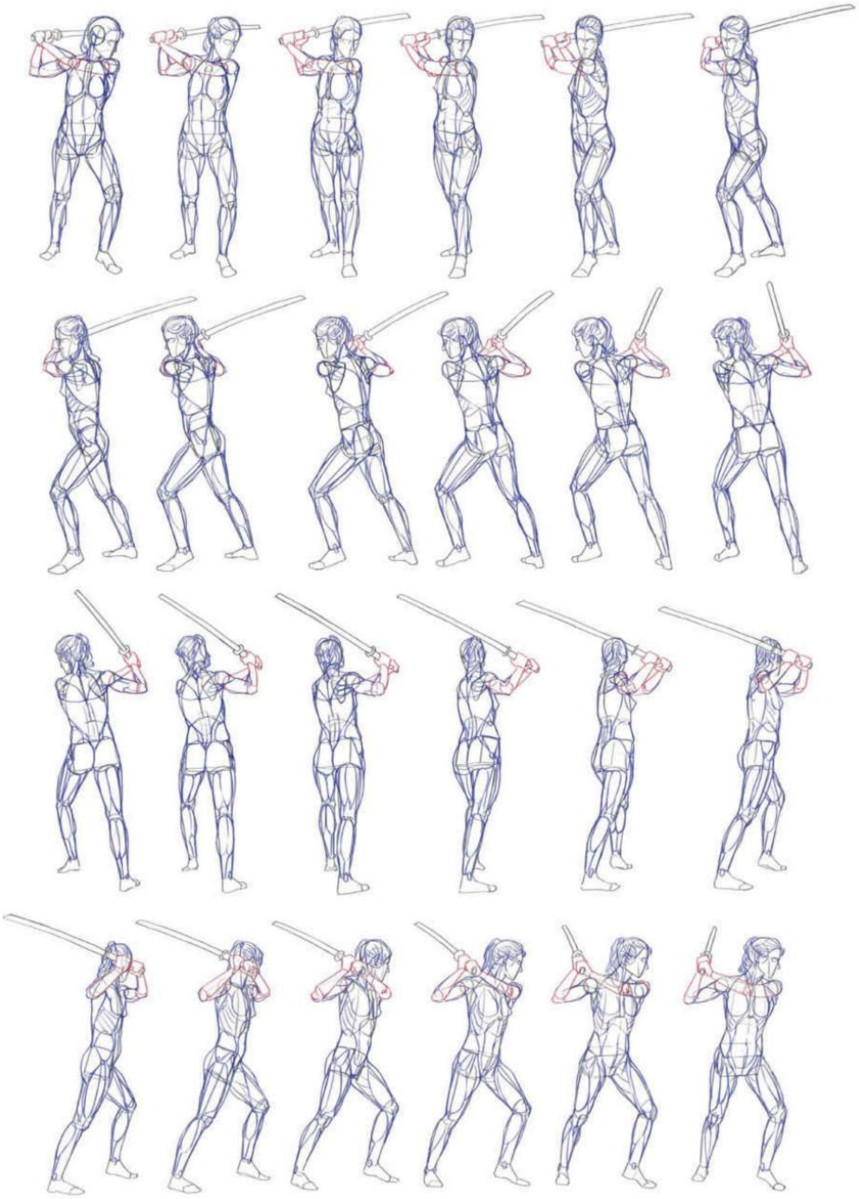




7.3.4 Dynamic Representation of Human Body from Multiple Angles and Movement Trends

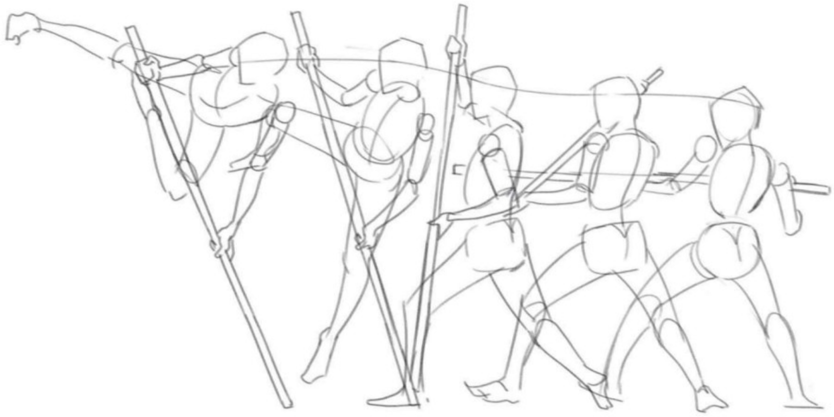
When learning to draw the human body, it is necessary to consider the changes in the angle of the human body. You can use the method of calculating the angle to draw the dynamics of the human body from different angles.

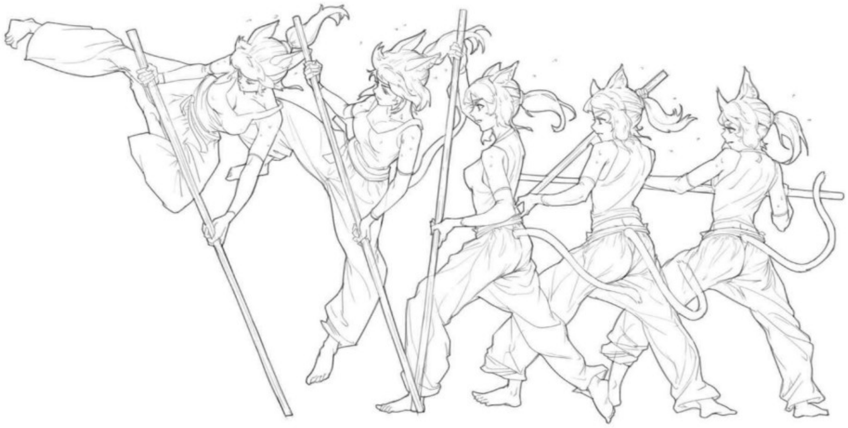




Learning to draw dynamic human figures requires not only mastering the movement of individual figures, but also understanding continuous movements.

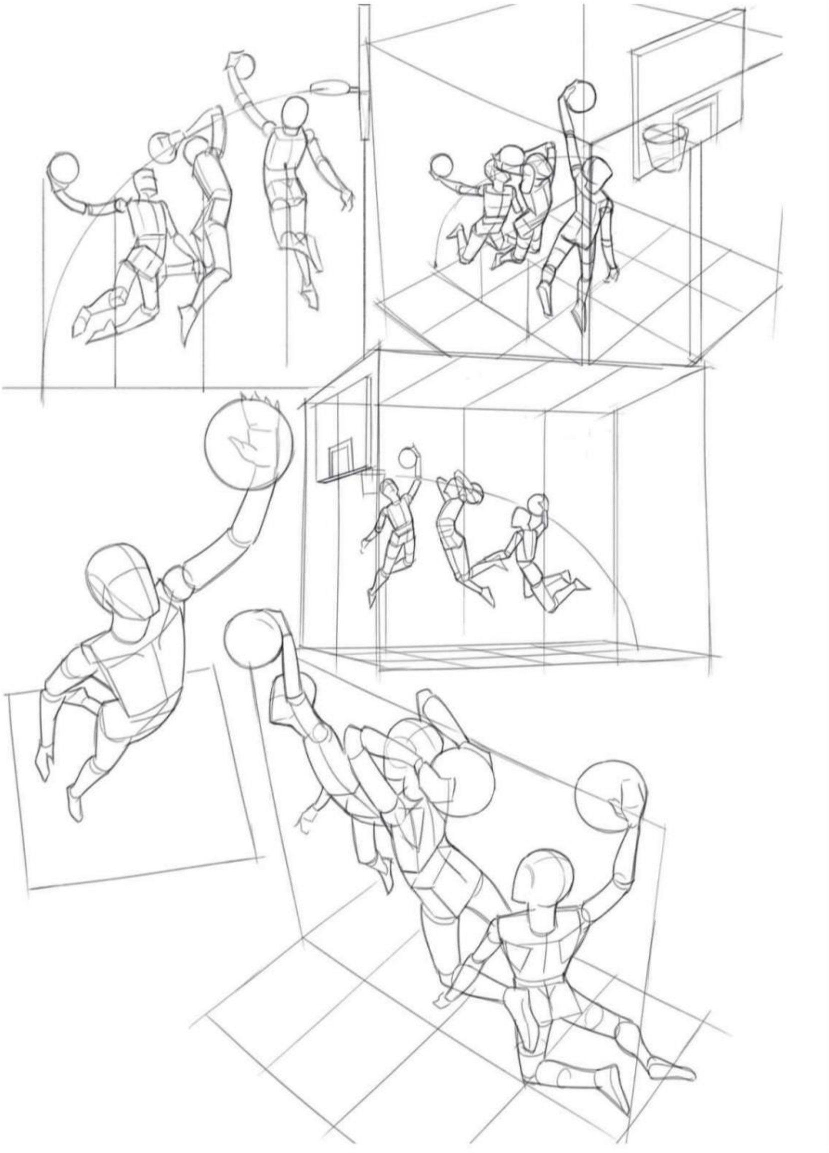
The dynamic movement of the human body.

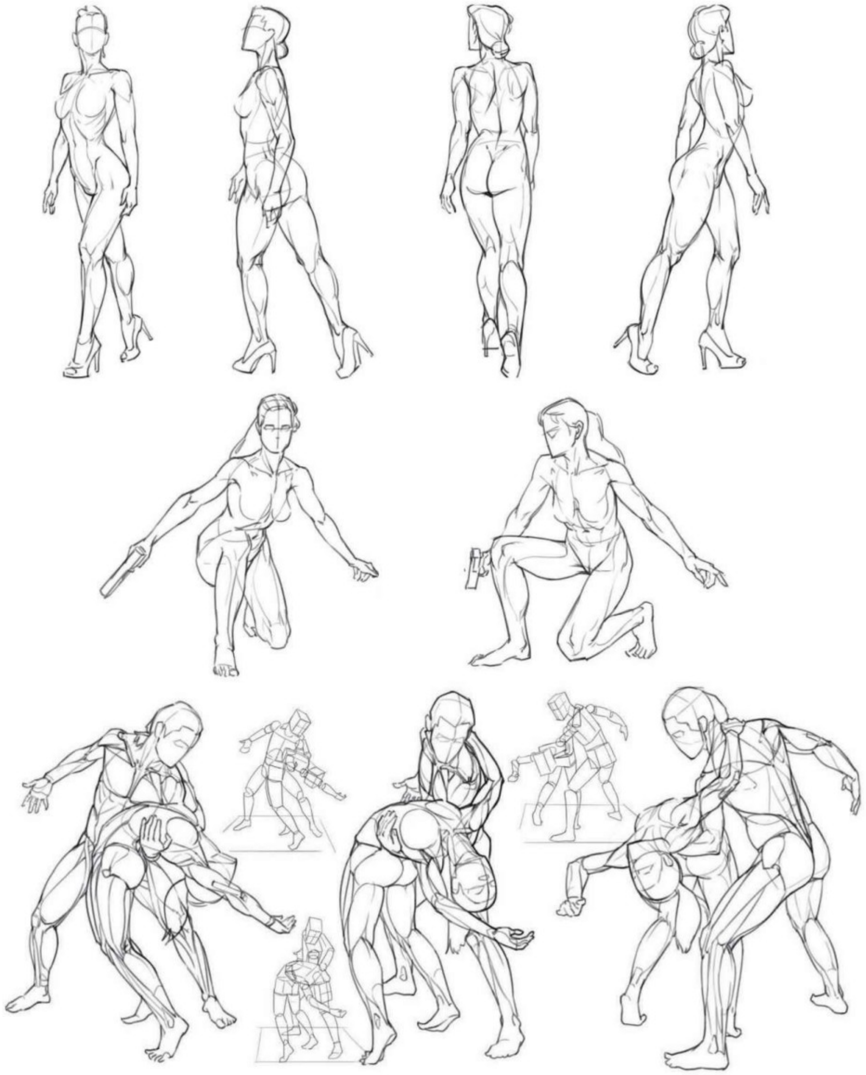


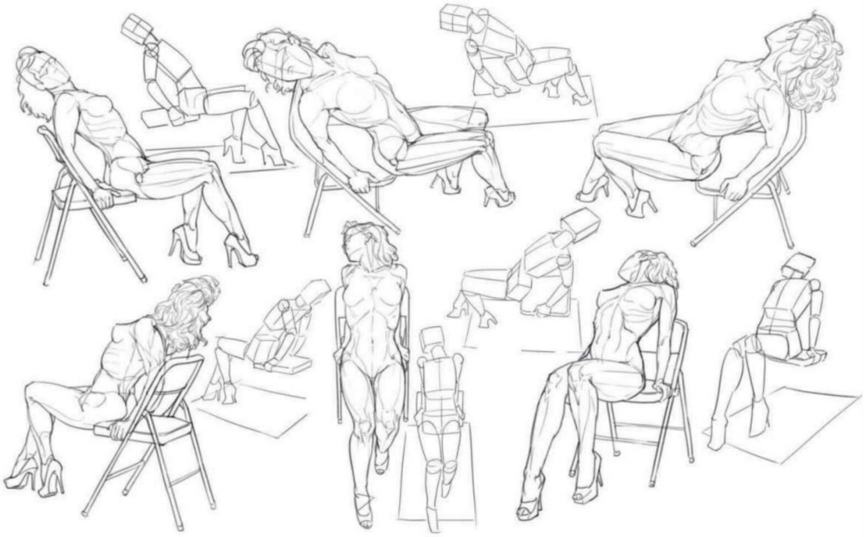


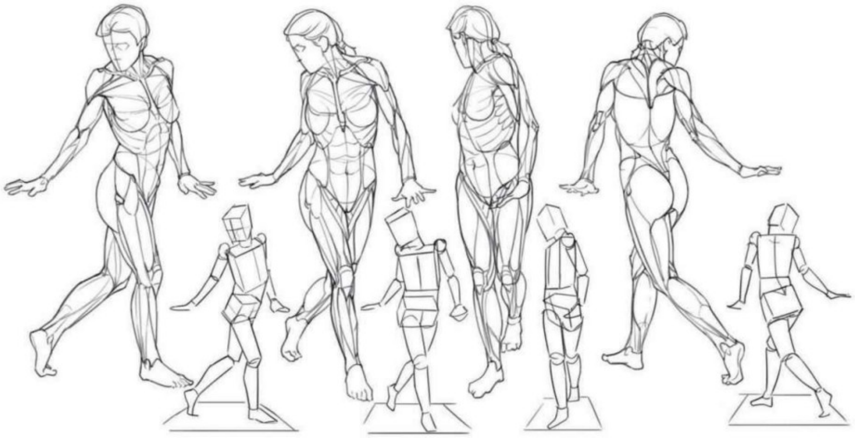
More specialized training

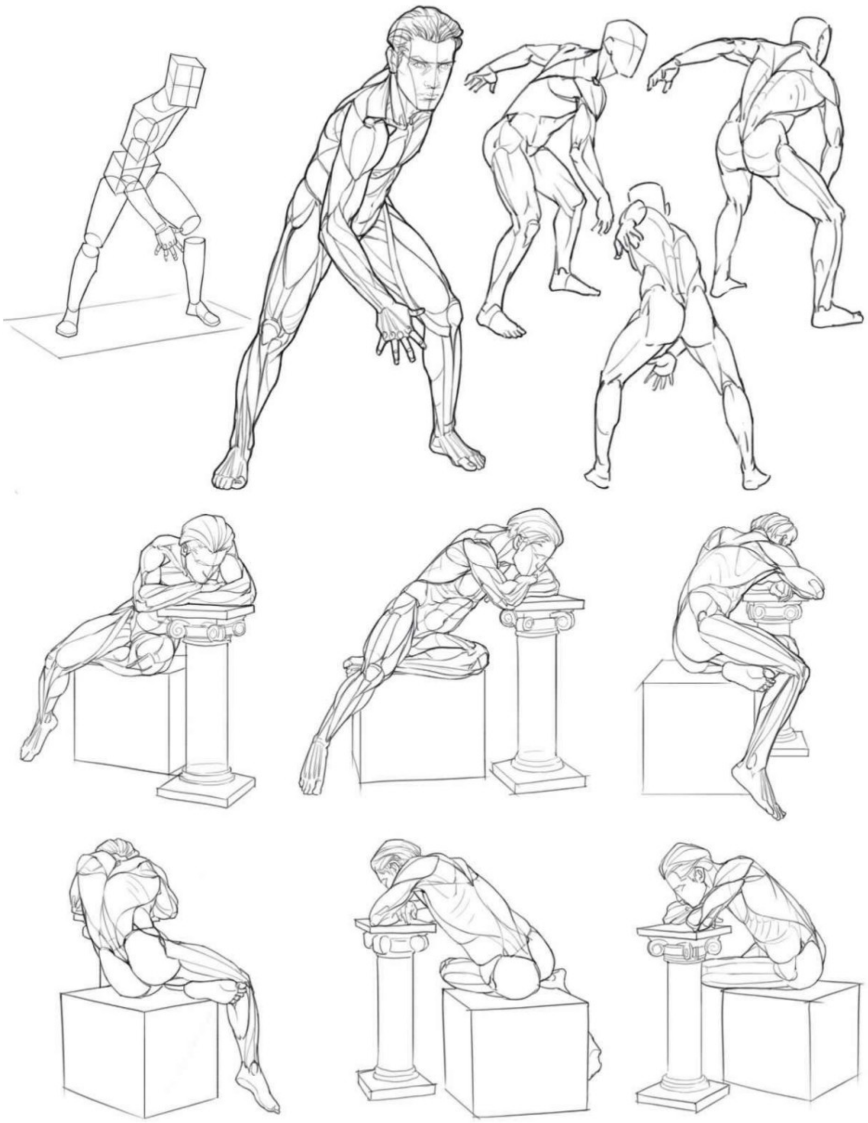
Perform a set of multi-angle human body rotation exercises.

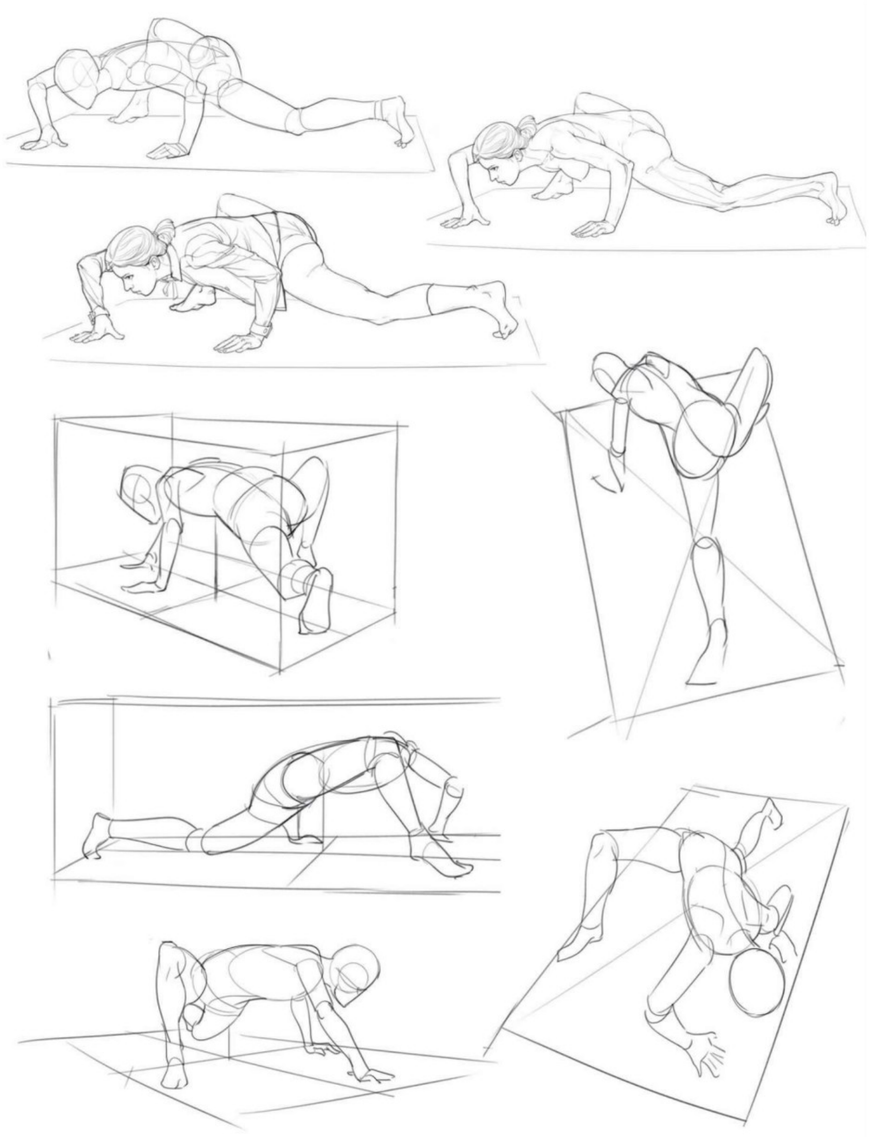


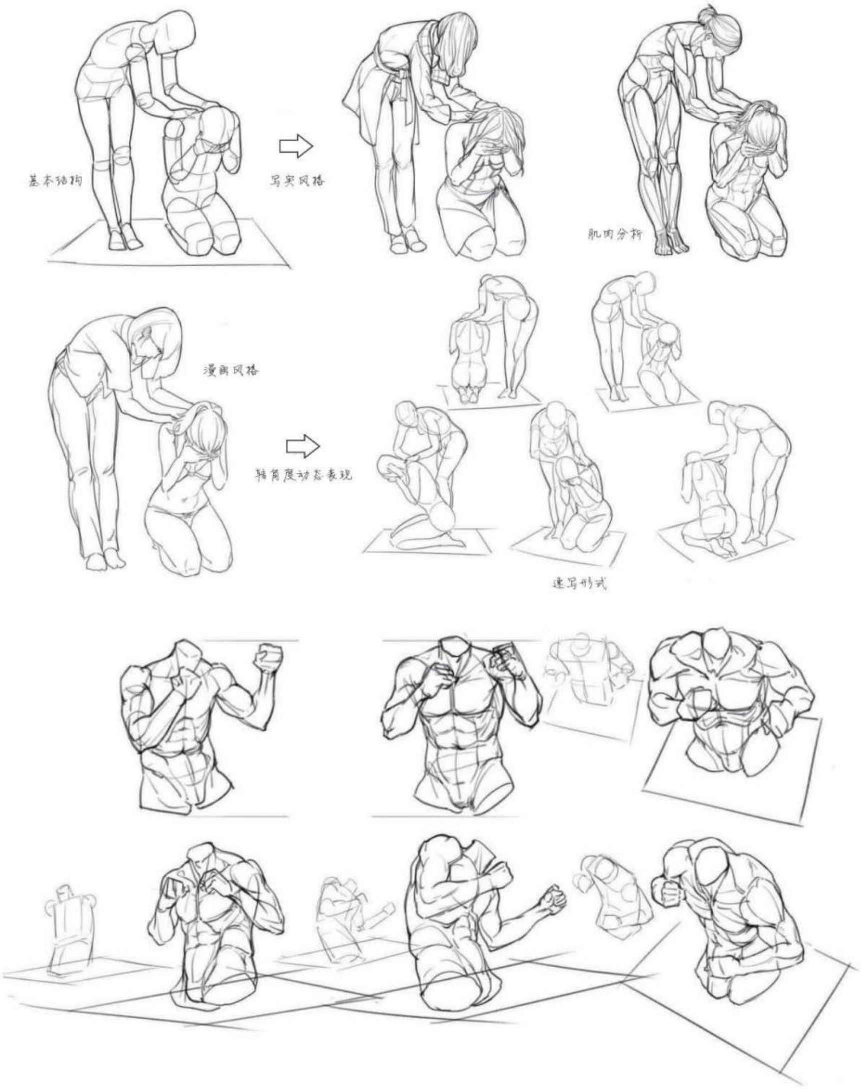




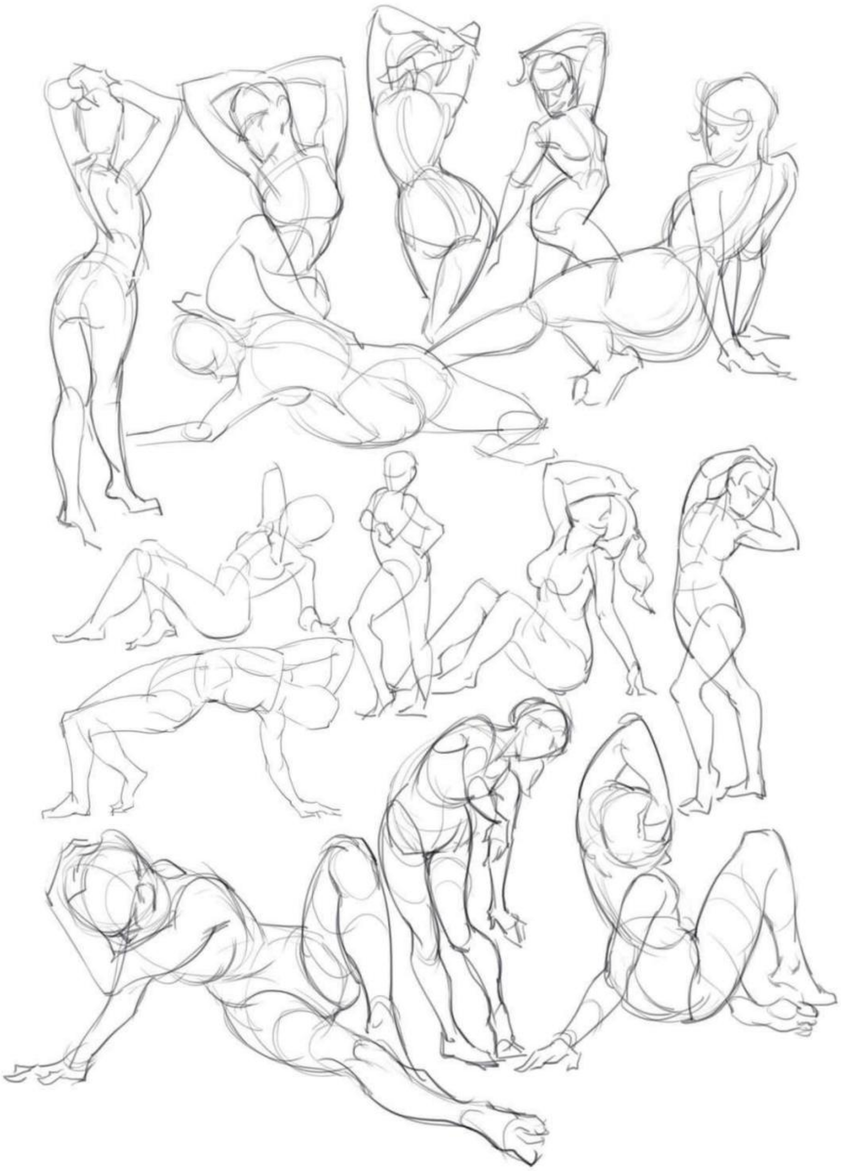




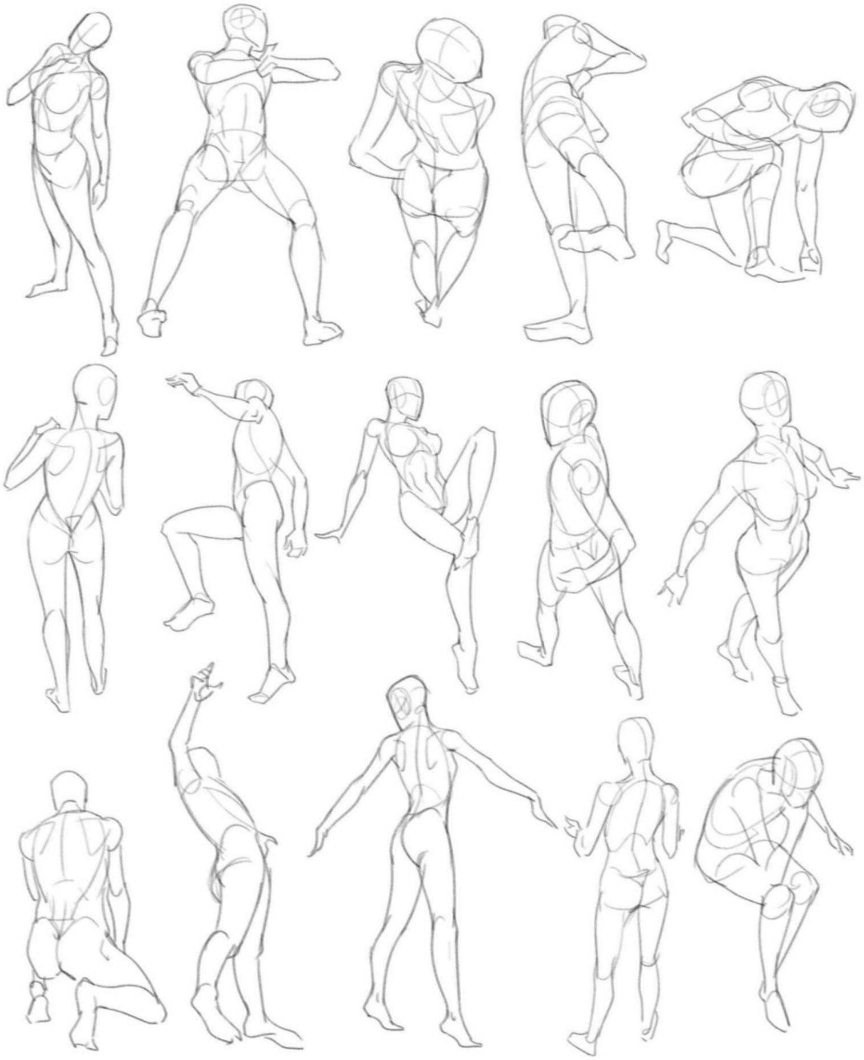


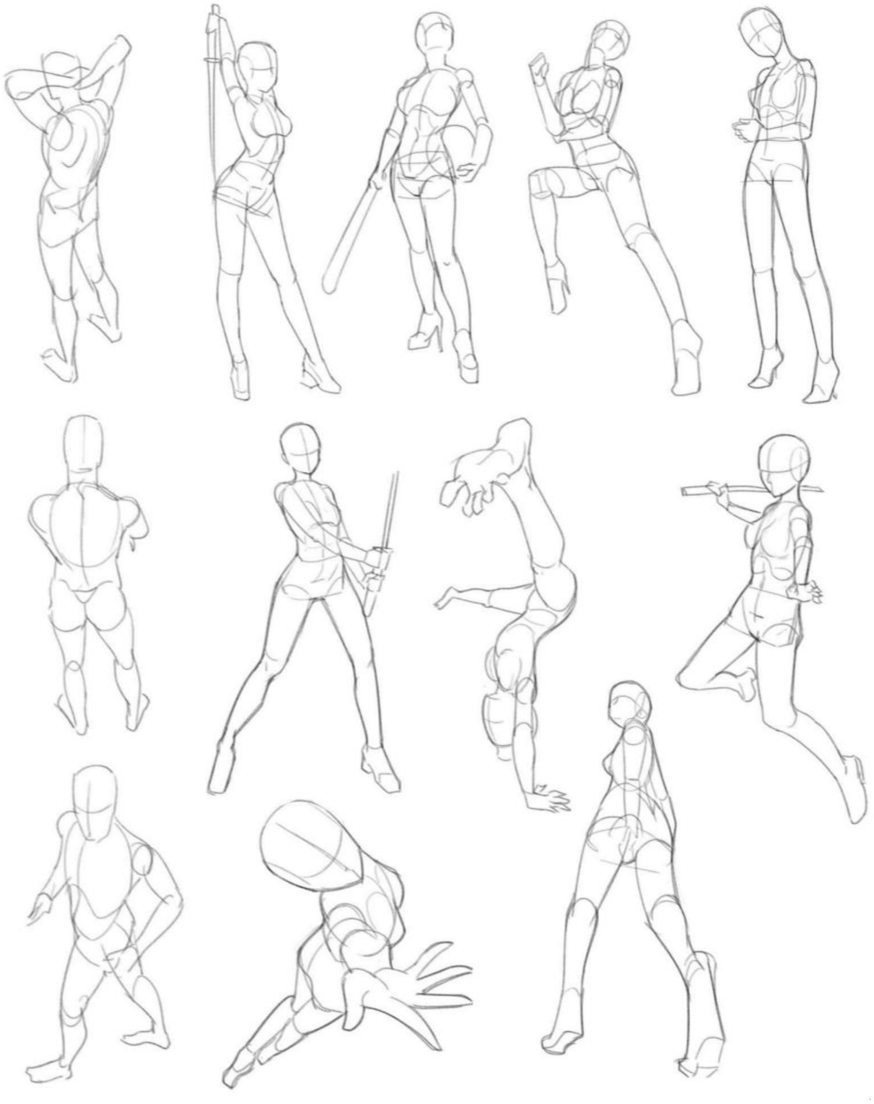

基本结构
写实风格
肌肉分析
漫画风格
转角度动态表现
速写形式

Do a set of one-minute human figure sketching exercises.

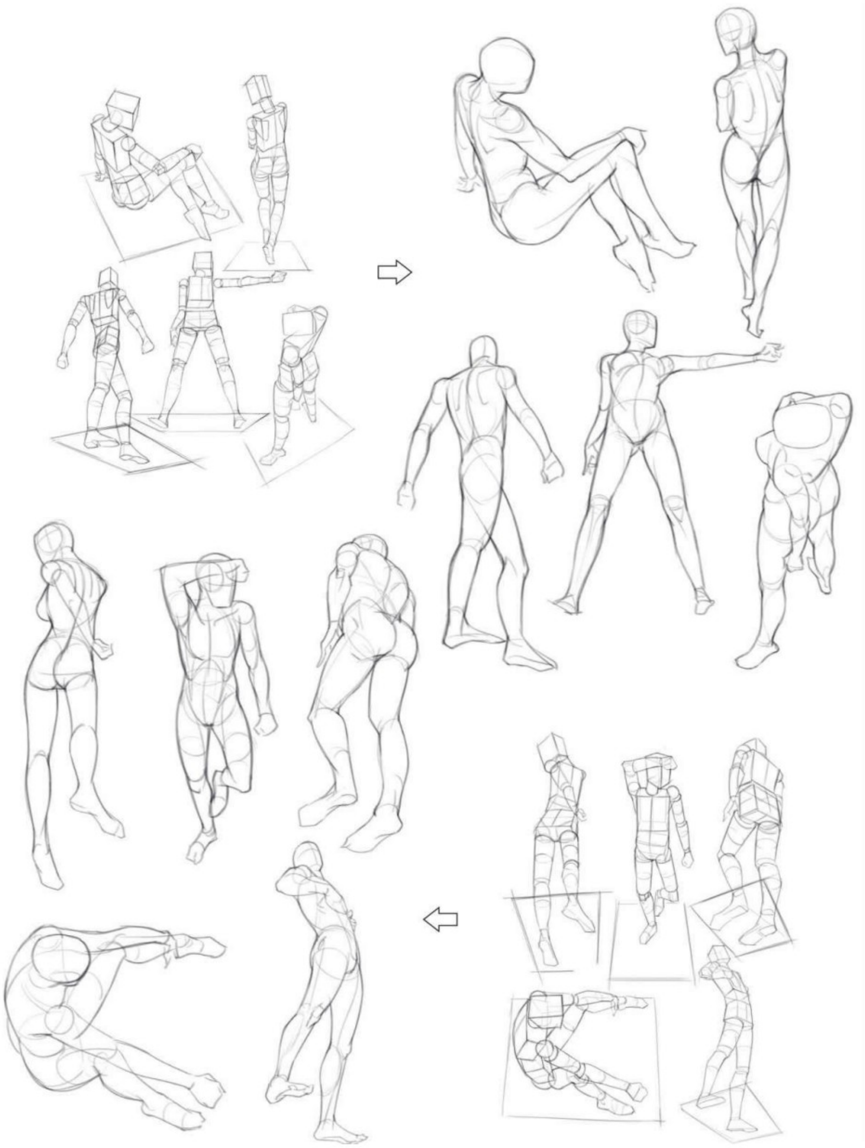


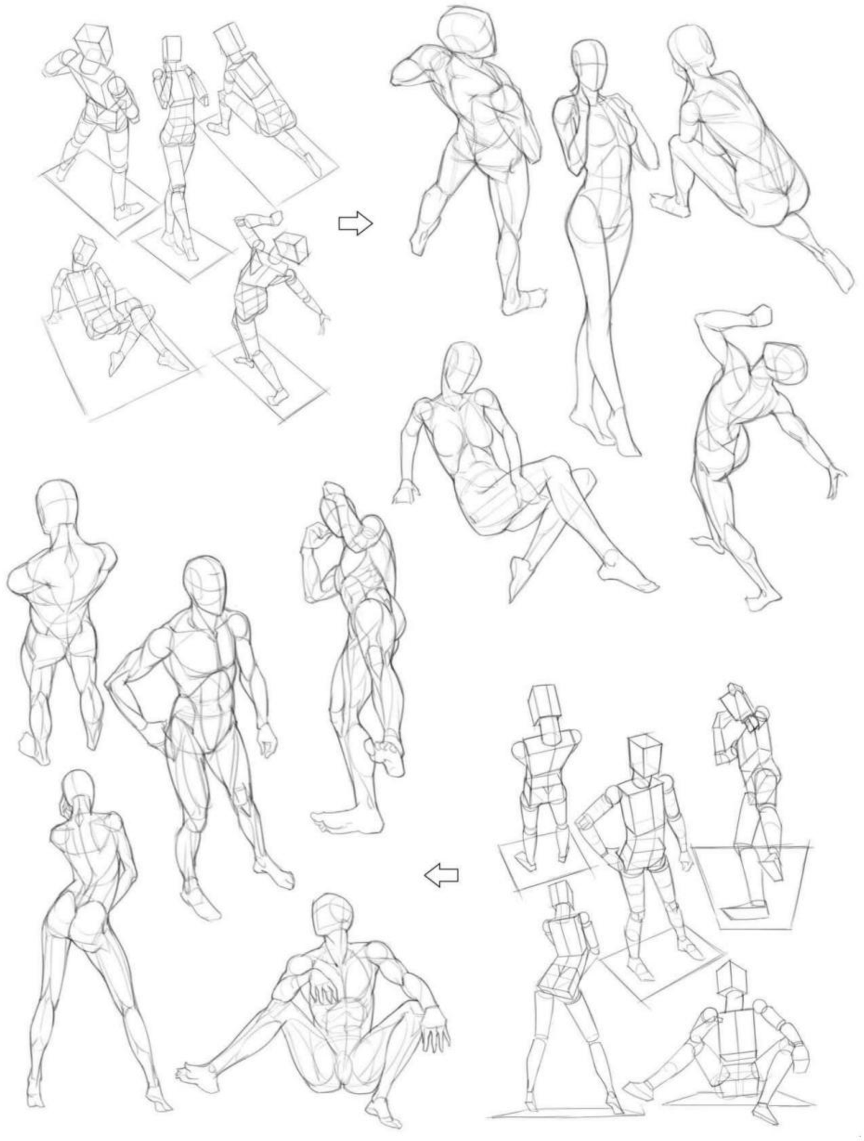
Do a set of two-minute human figure sketching exercises.



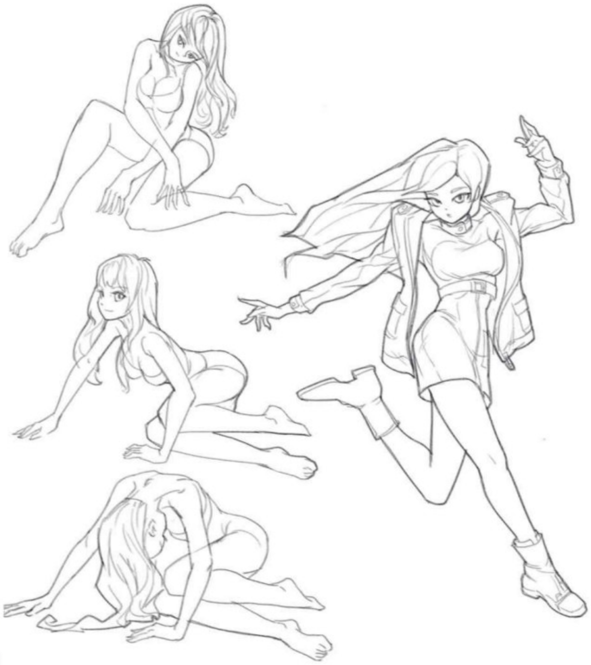


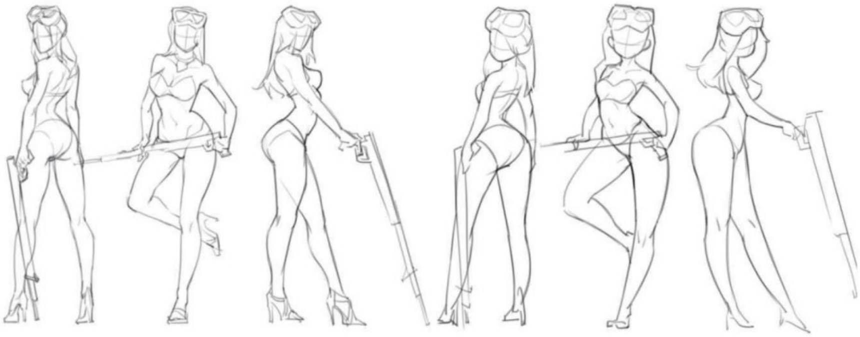
Create a set of dynamic exercises featuring blocky figures and structured figures.

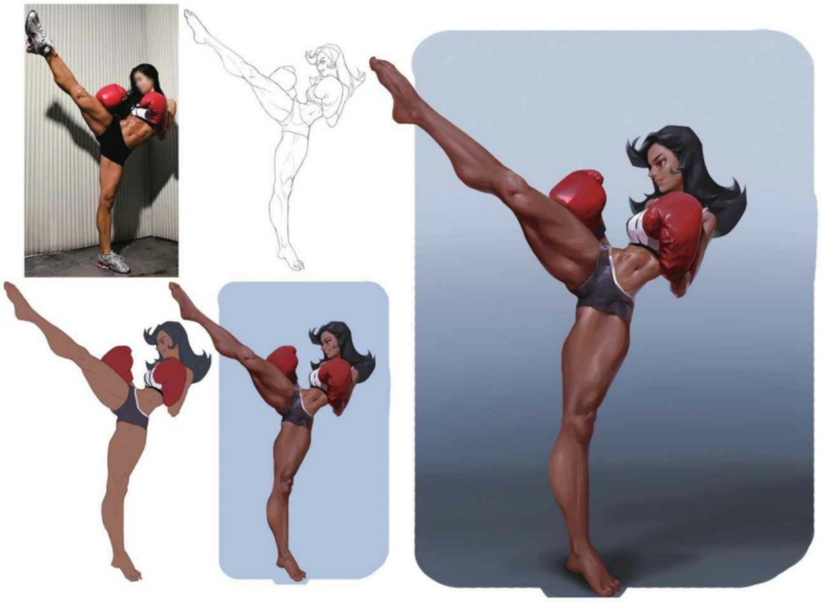


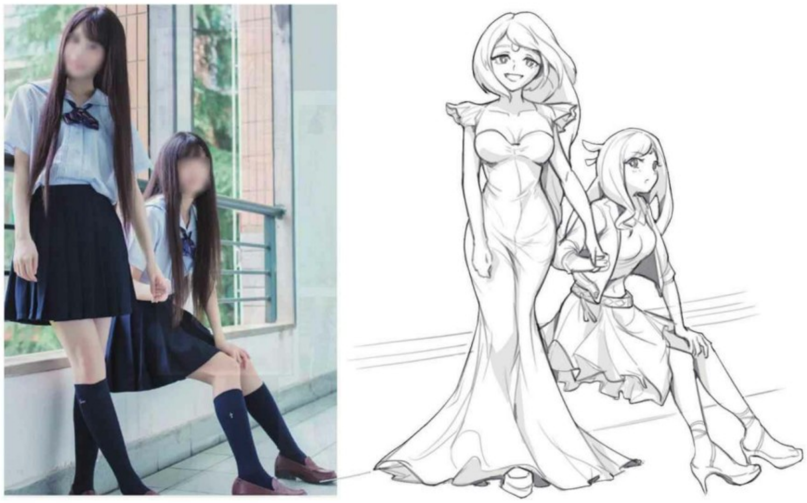


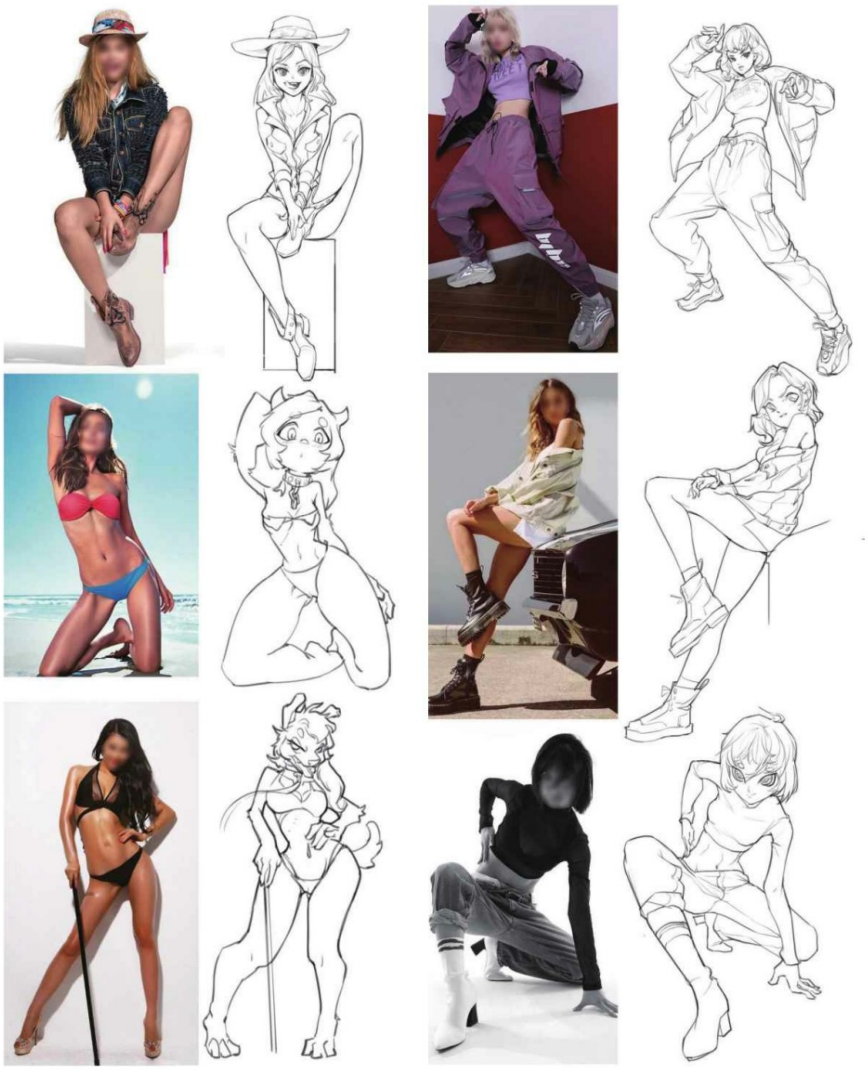
Use the reference photo to do a set of human body dynamic exercises.

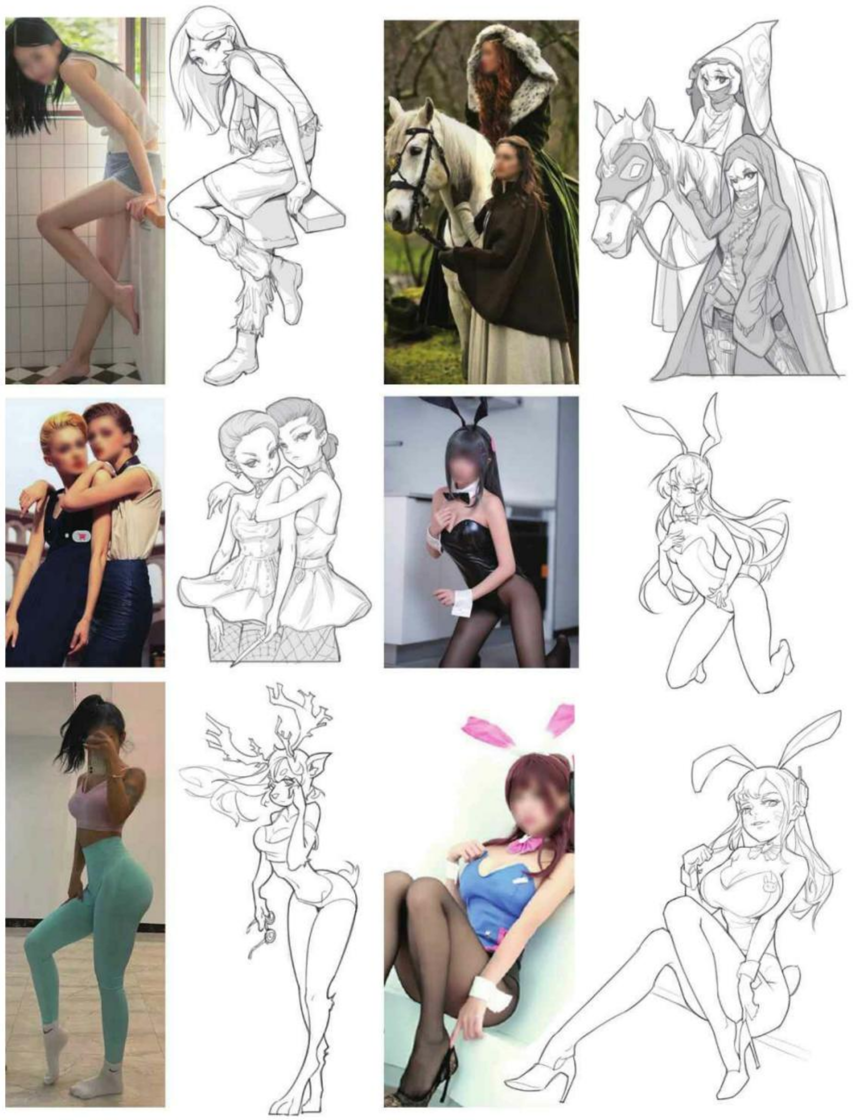




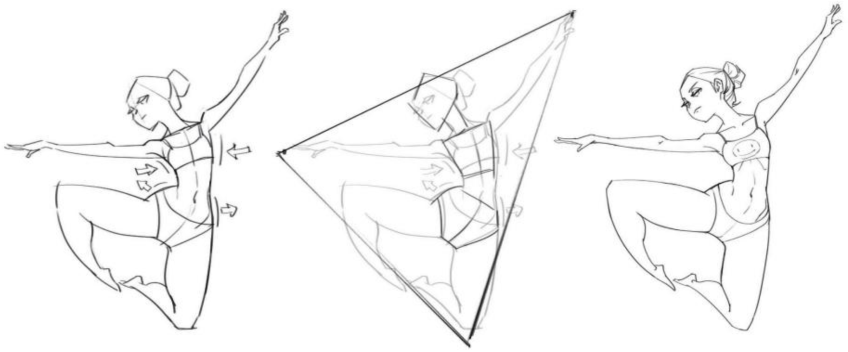




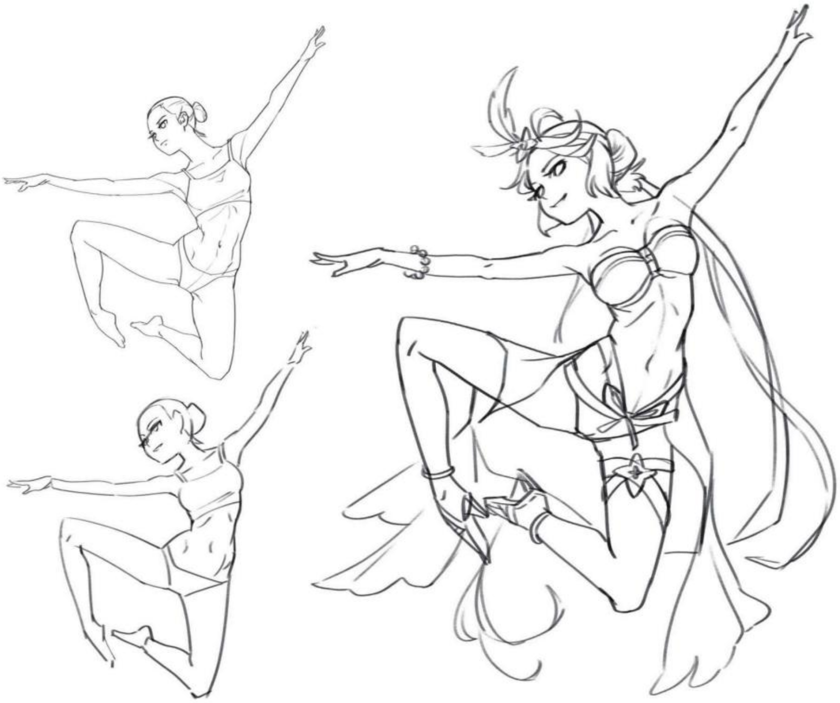




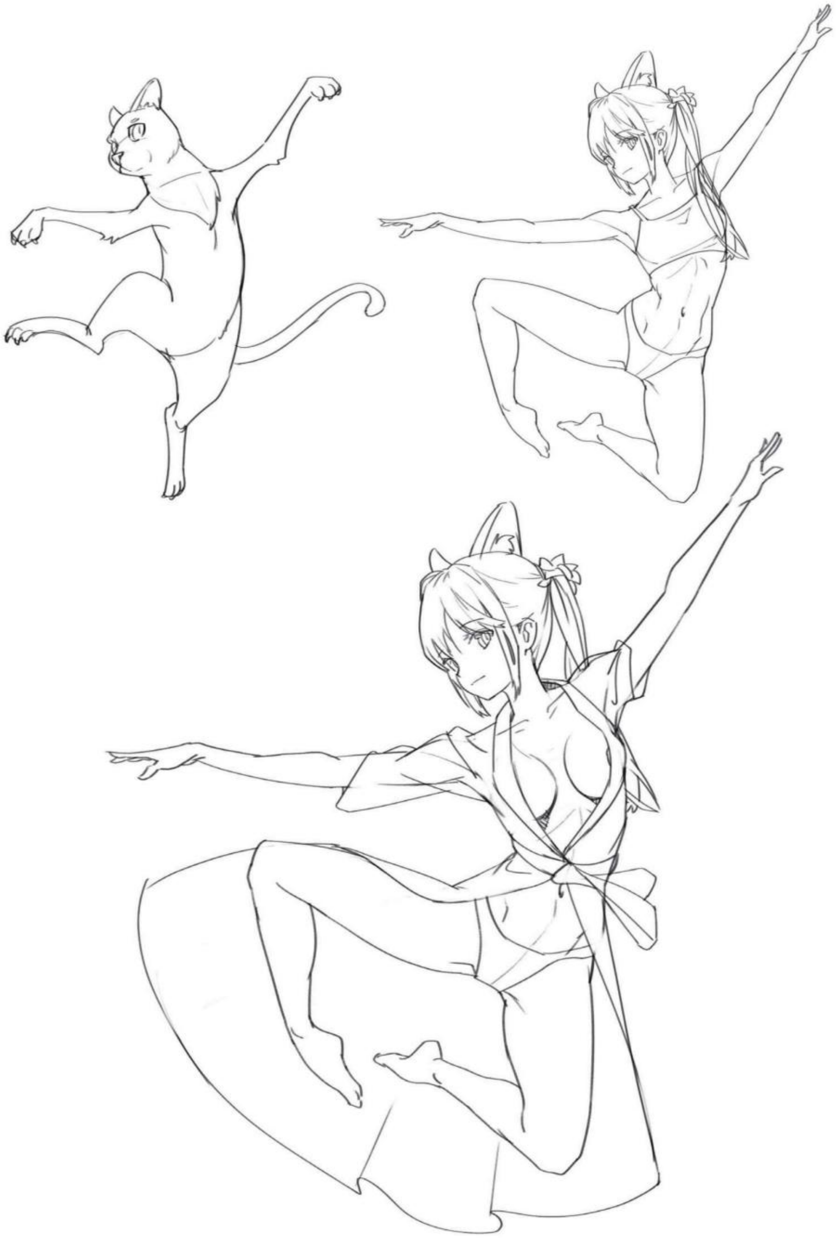
Do a series of exercises switching between different styles of figures, paying attention to adjusting the proportions of the human body in the sketch.



Strengthen the contrast of volumes, use straight lines or curves to summarize the structure, and enhance the shape of the graphic.

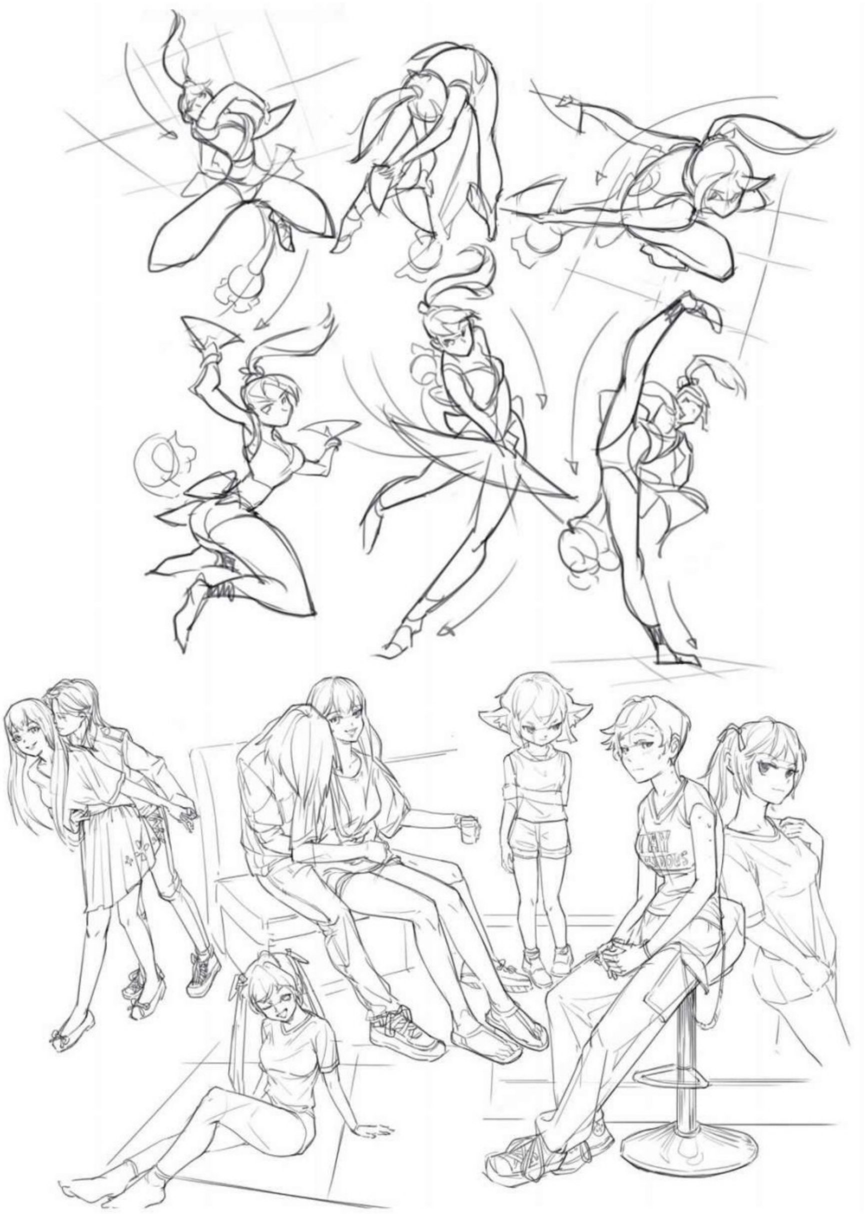


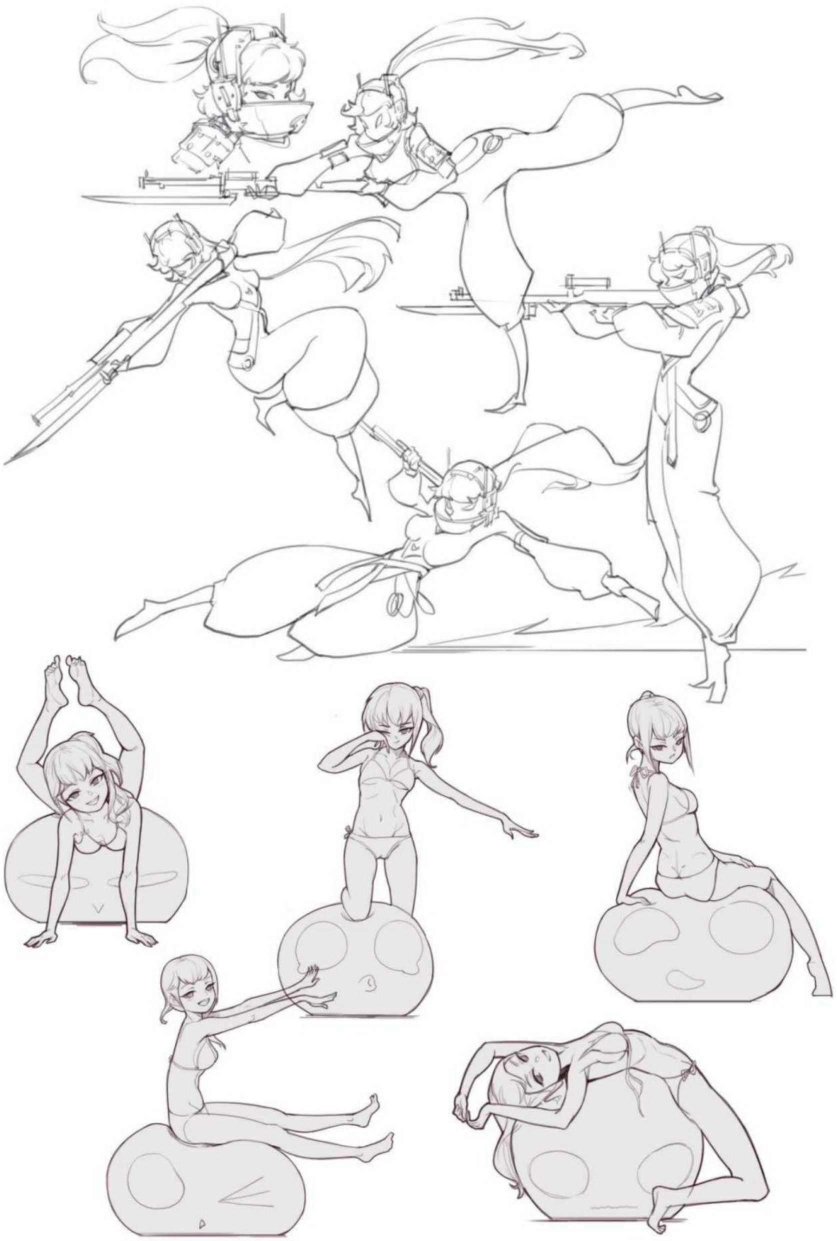
Simplify the sketch appropriately and change the character's clothing.

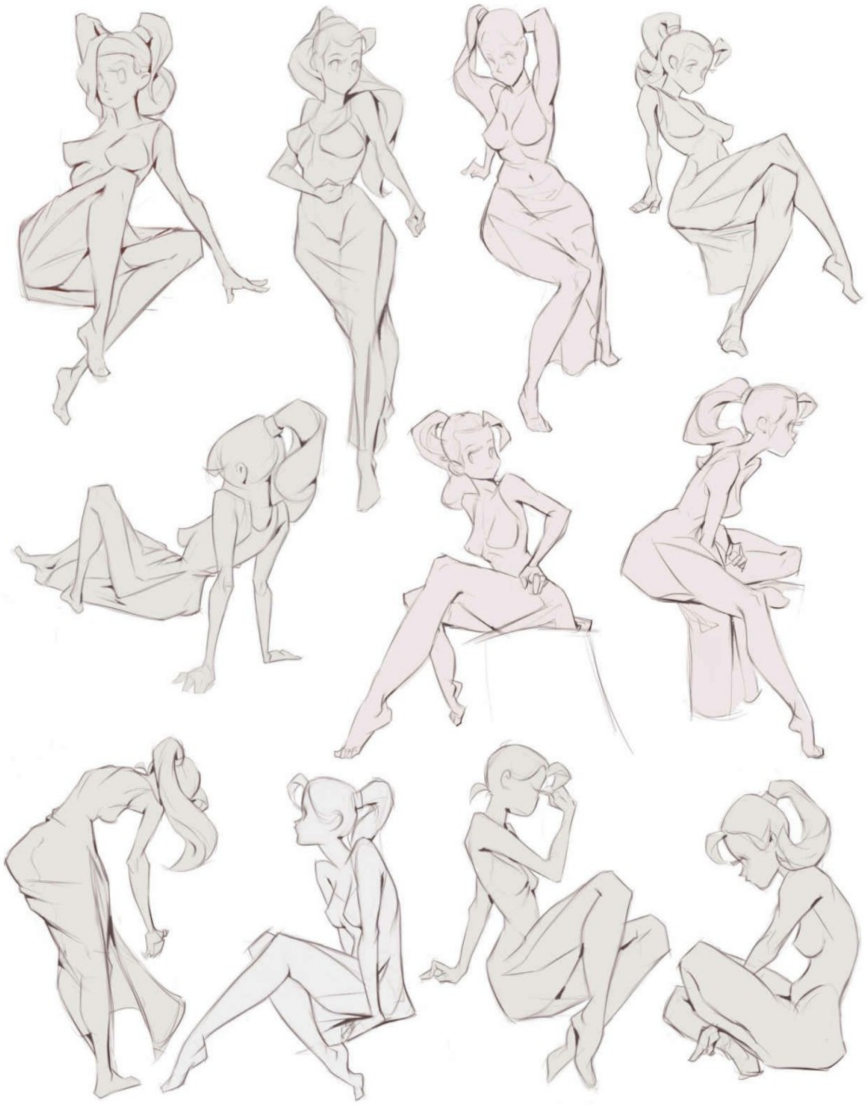


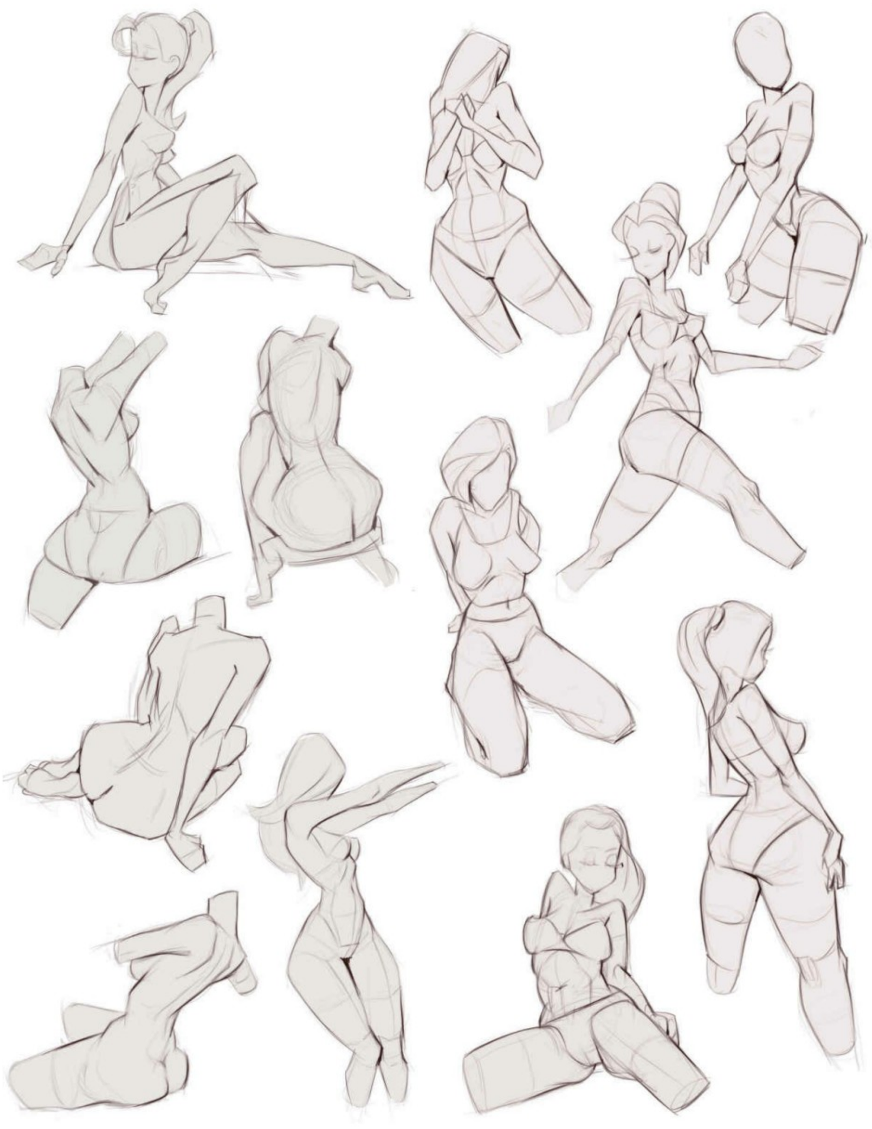
Draw the same pose as a cat, and continue to adjust the clothing to create different styles of character designs.

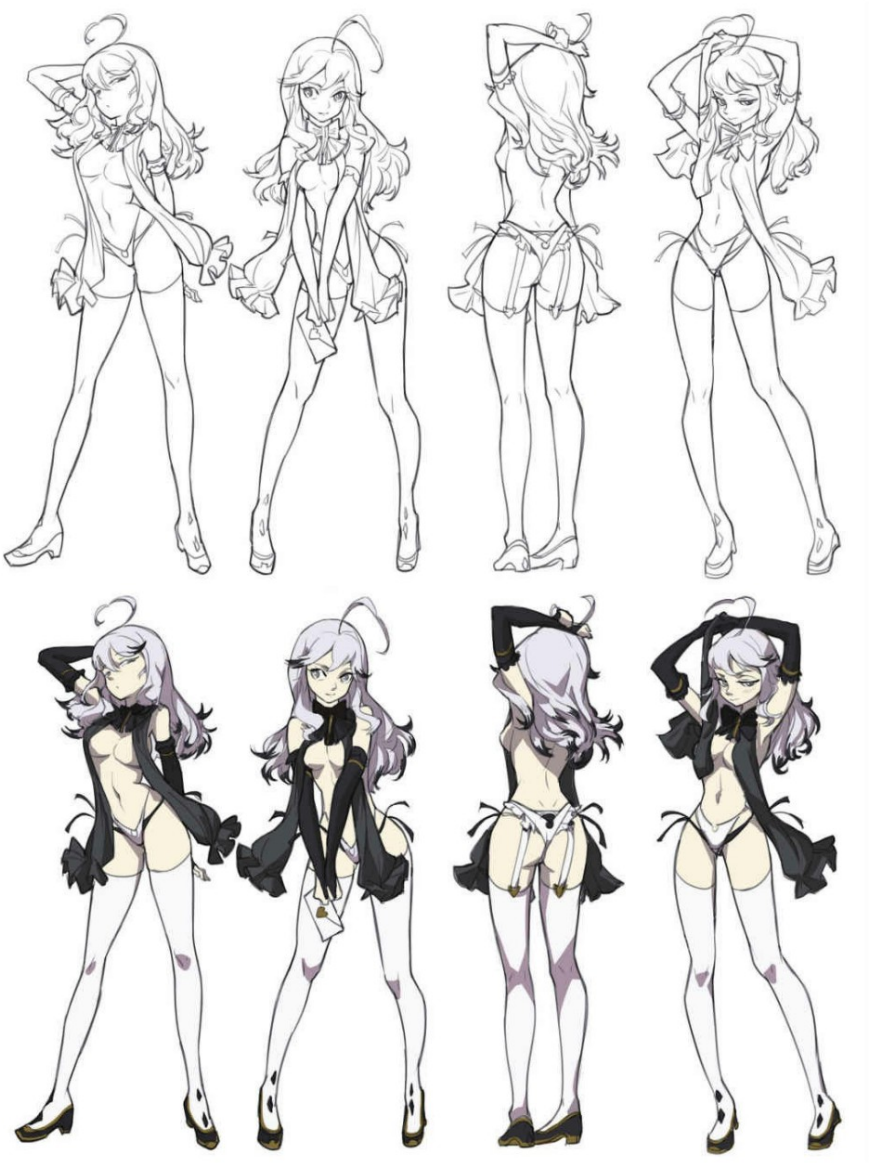
Perform a set of dynamic human body deformation exercises.

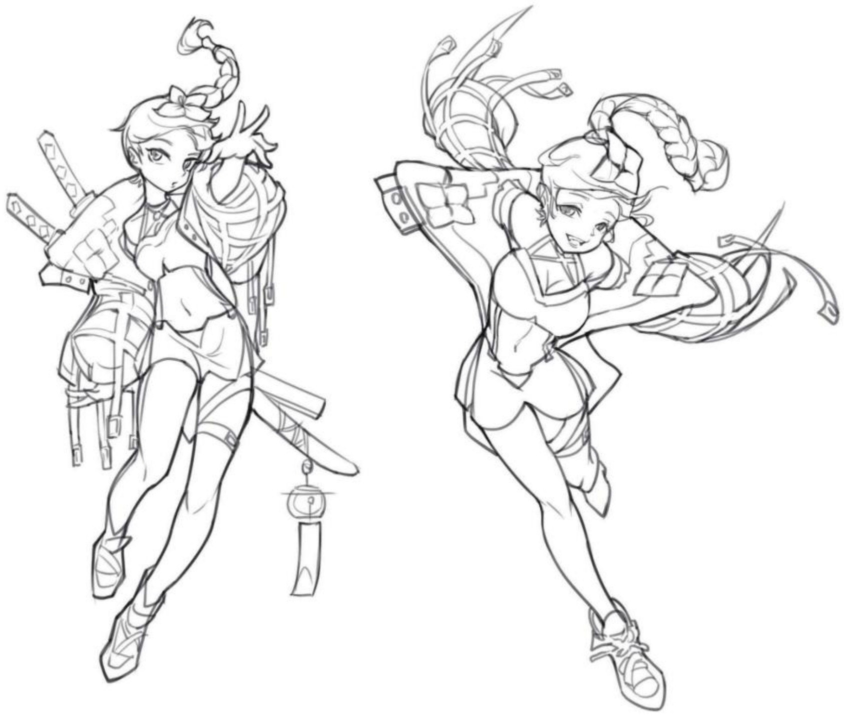




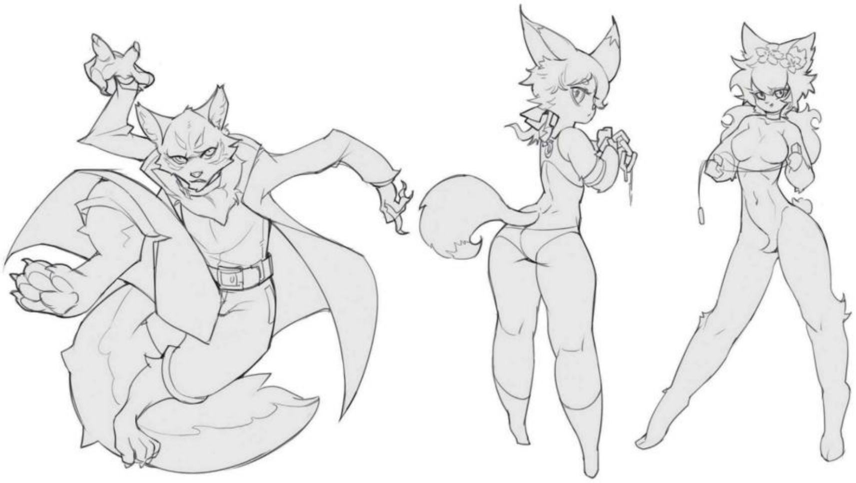


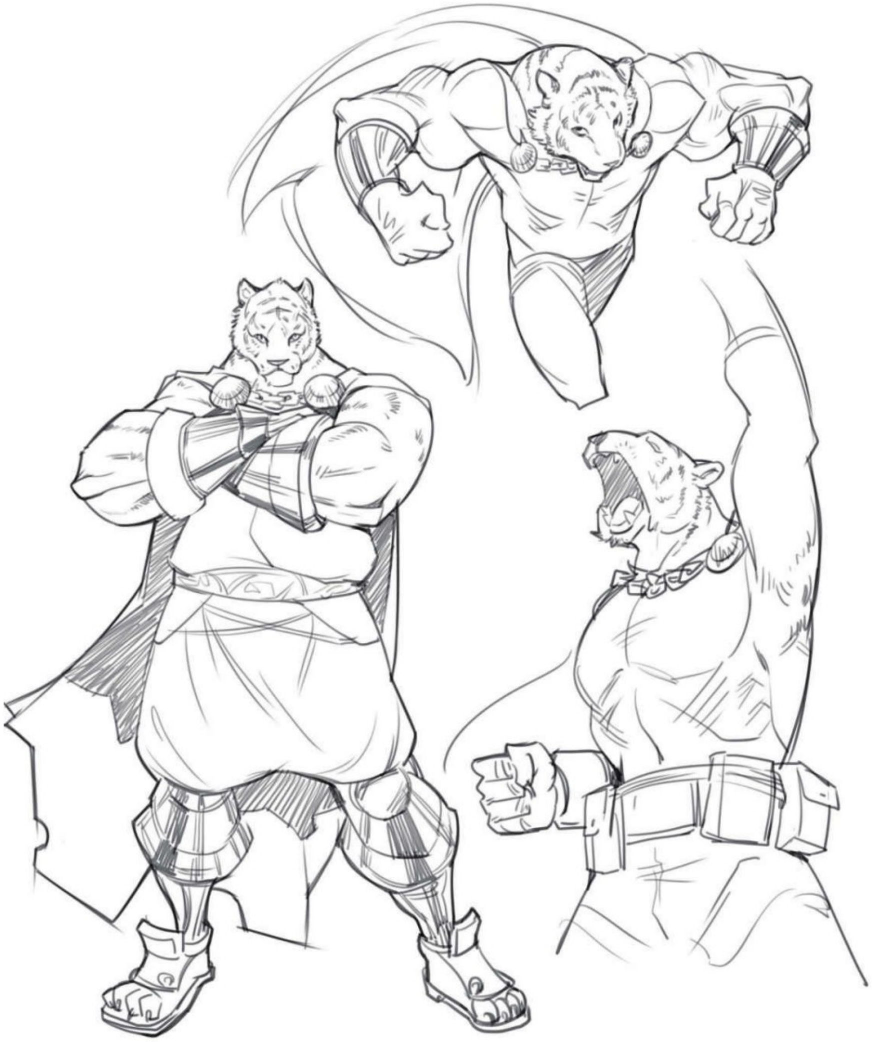


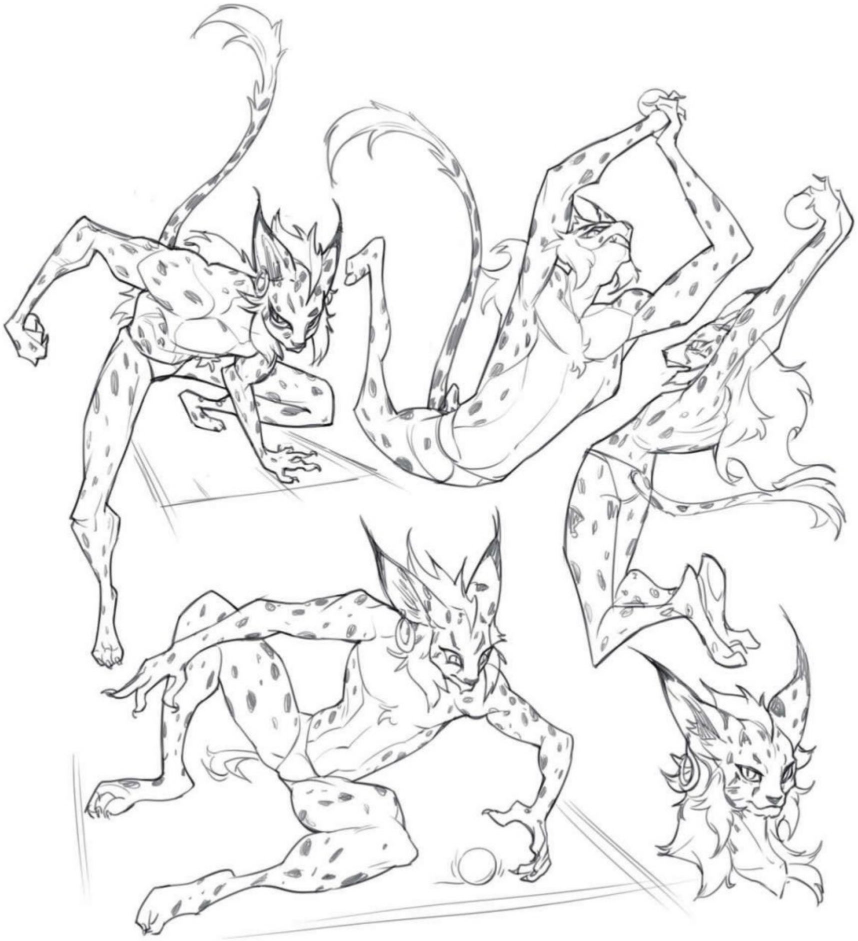




Do a set of orc animation exercises.





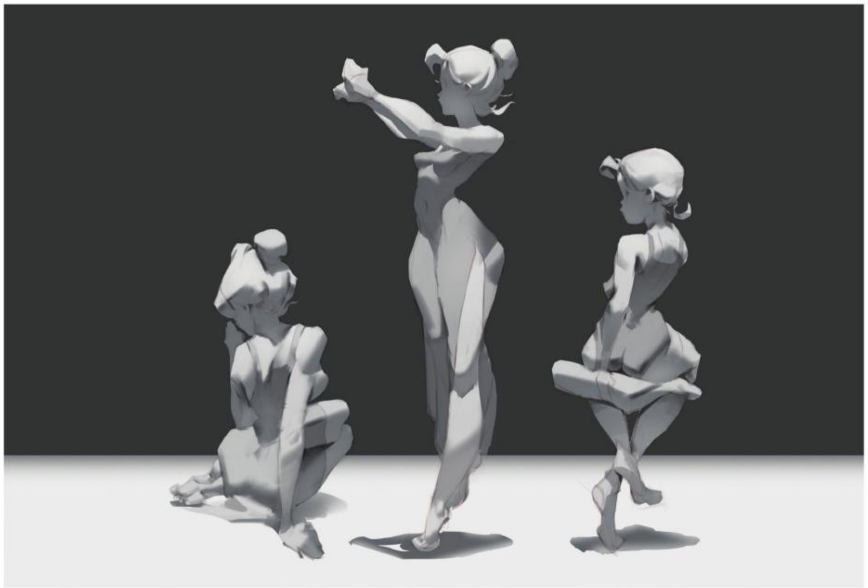


Chapter 8 Special Training in Light and Shadow

exist In actual painting, only after mastering the preceding knowledge points can one learn about light and shadow effectively. The previously learned knowledge points will be better applied. This chapter explains the theoretical knowledge of light and shadow and the techniques for using light and shadow in actual painting. Here, the author will guide you through systematic light and shadow exercises by systematically refining the knowledge points of light and shadow and analyzing case studies, thereby enhancing your understanding and awareness of structure and three-dimensionality.

8.1 Basic Concepts of Light and Shadow

The foundation for representing things in painting is light. Without light, we cannot see the world before us, let alone paint. Light brings objects to our attention, creating strong contrasts of light and shadow, revealing the clear outlines of objects, and allowing us to see the ever-changing phenomena of light and shadow.



8.1.1 Three Major Surfaces and Five Major Tones

The three planes refer to the three surfaces of an object under a light source: the bright side, the dark side, and the gray side. Among them, the gray side...

Also known as a transition surface.

The five tones refer to highlights, midtones, the terminator (line between light and shadow), reflected light, and cast

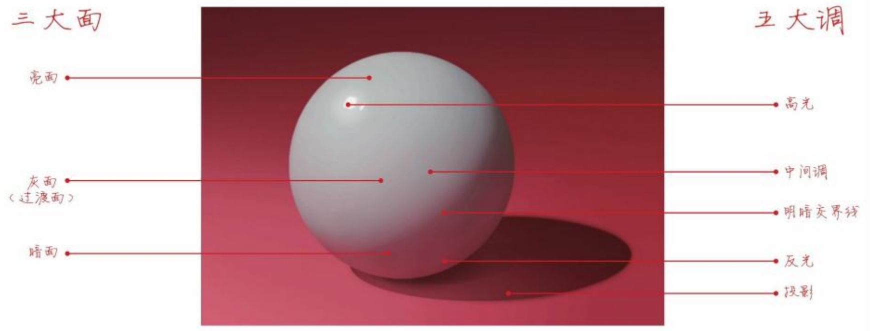
shadow. Highlights generally refer to the brightest part of an object when illuminated. Different materials produce different highlights; for example, smooth surfaces have more pronounced highlights, while rough surfaces have softer highlights that are less easily observed.

Midtones: Generally refers to the areas in an image where colors are most prominent and can be reproduced to the greatest extent.

The areas of an object's inherent color. When painting, pay close attention to these areas; when an object's inherent color is dark, its midtones are also dark.

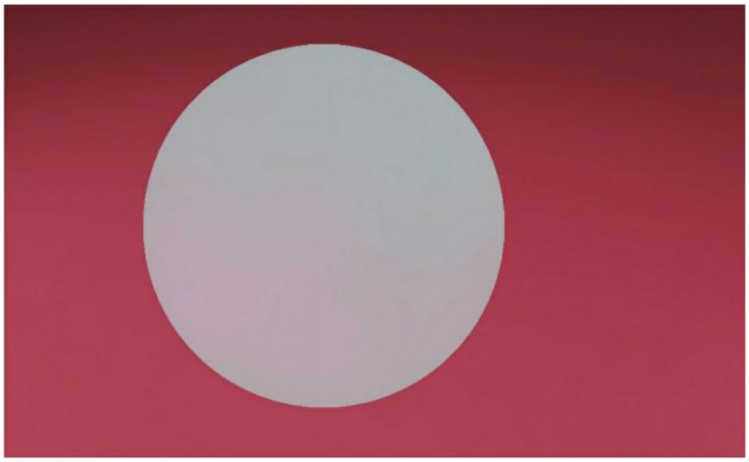
The terminator (or terminator) refers to the line between the light and dark sides of an object when it is illuminated. The color of the boundary between light and shadow is also the darkest color on the entire surface of the object. It's important to note that when depicting the boundary between light and shadow on an object, it shouldn't be rendered too realistically, otherwise the image will appear stiff. Furthermore, the texture of an object in the real world also affects the depth of the boundary between light and shadow; for example, the boundary between light and shadow on smooth objects (such as metal) is sharper, while the boundary between light and shadow on rough objects is softer. Reflected light: refers to the light source formed in the dark area of an object. Generally, the color of reflected light is the lightest color in the dark area, and reflected light is affected by the surrounding ambient color. For example, glass and smooth metal reflect light very strongly, and can even refract nearby objects.

Projection: Also known as shadow, it refers to the shadow cast by an object when it is illuminated. Generally, the shadow is darkest near the area of the object that is not illuminated.

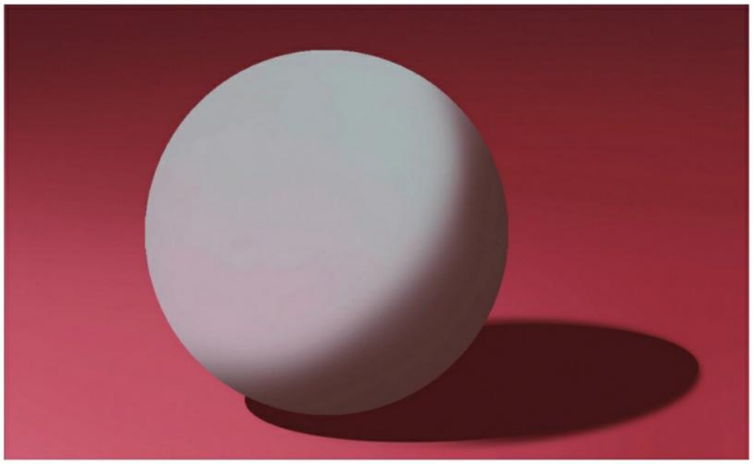


To help everyone better understand the concept of light and shadow, the following is a simple analysis of the drawing process of a sphere under light and shadow.

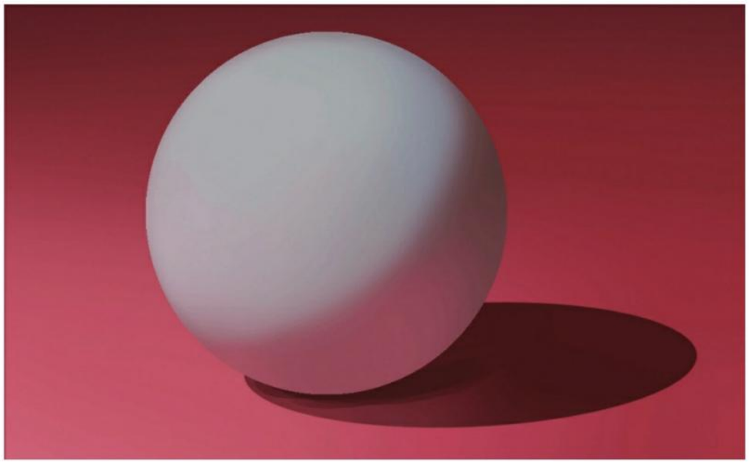
01 Draw a white circle and fill the canvas with the background color.



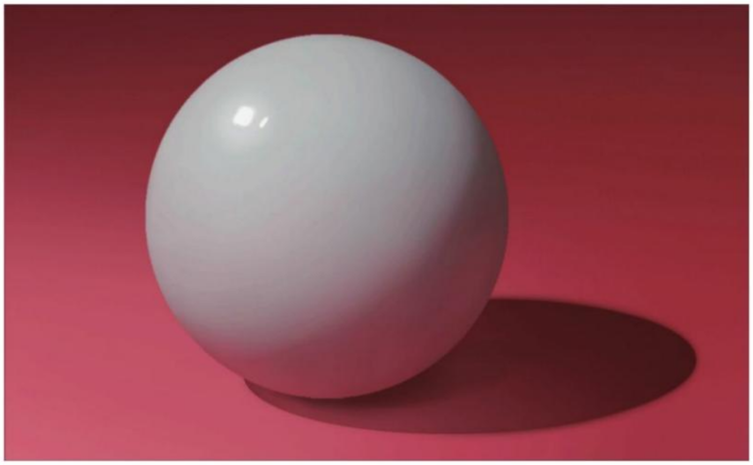
02. Define the lighting and shadows. Set the light source to the upper left corner of the canvas, and use color blocks to divide the sphere into the light side, dark side, terminator, and shadow area.



03. Depict the reflective surface of the sphere based on light and shadow, and then add a red background color to the reflective area according to the degree of influence of ambient light on the object.



04. Add occlusion areas to the sphere and the ground (this concept will be explained in detail later), as well as highlights to the sphere. This completes the drawing of a sphere with full lighting and shadow effects.



hint

Because the background color is red, the reflective area of the sphere is biased due to the influence of ambient light. red.

Next, based on the principles of light and shadow, we will analyze how to divide the human body into blocks during the construction process.

Analyze and utilize light and shadow.

01. Decompose the human body into simple geometric shapes, analyze and determine the three main surfaces of each geometric shape.

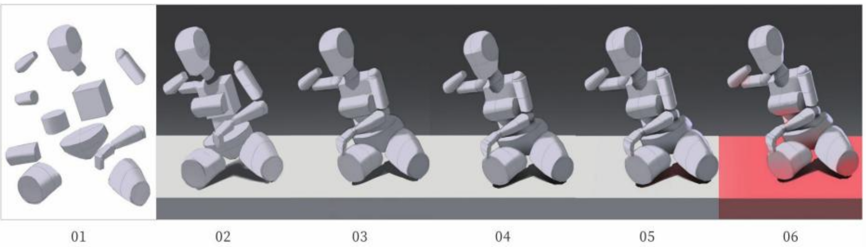
02. Set the canvas background color as needed, and then try to combine the blocks representing different parts of the human body, analyze and represent the projections between the blocks.

03 Analyze and determine the terminator and midtones.

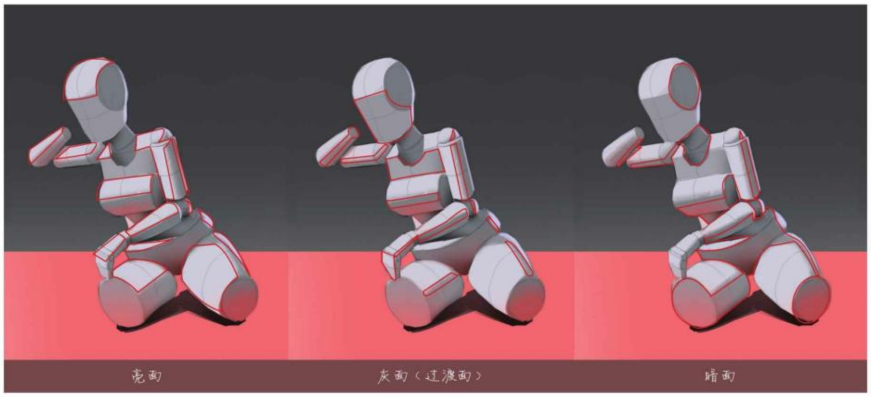
04 Further deepen the hue in areas that are not illuminated.

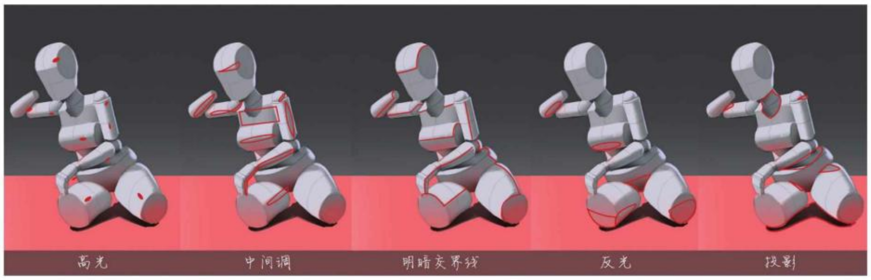
05. Virtually add a contour side light to enhance the three-dimensionality of the human body.

06. Set an ambient color, and then draw the reflective parts of the image based on the ambient color.



The following is a schematic diagram of the distribution of the three main surfaces and five key areas of the human body.





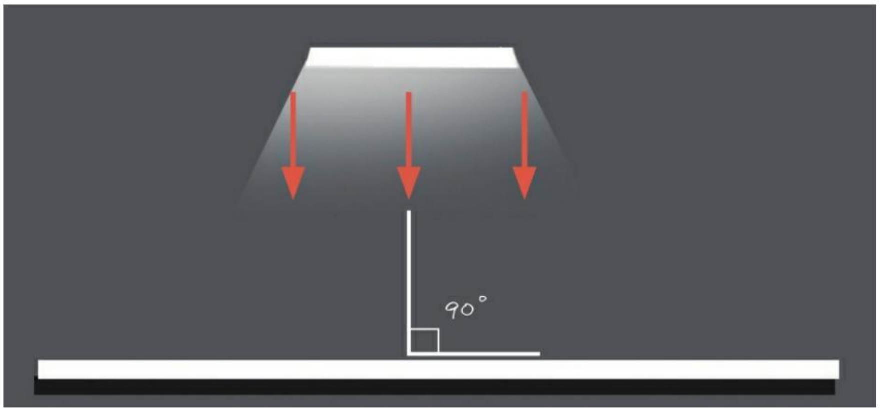
8.1.2 How to calculate light and shadow

The essence of vision is the perception of light. Volume is an objective reality, but the human eye cannot directly perceive volume; it can only perceive it through

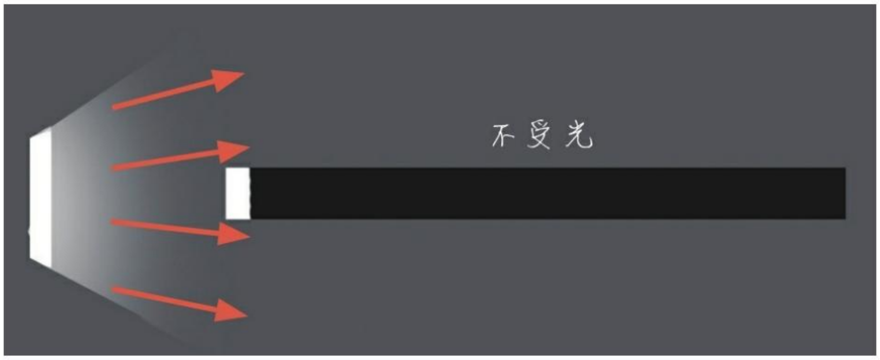
light. Below, we will use a diagram to illustrate the visual effects of

different light sources on objects.

Perceive changes.



The brightness of light reaches its maximum when it shines on an object perpendicularly.

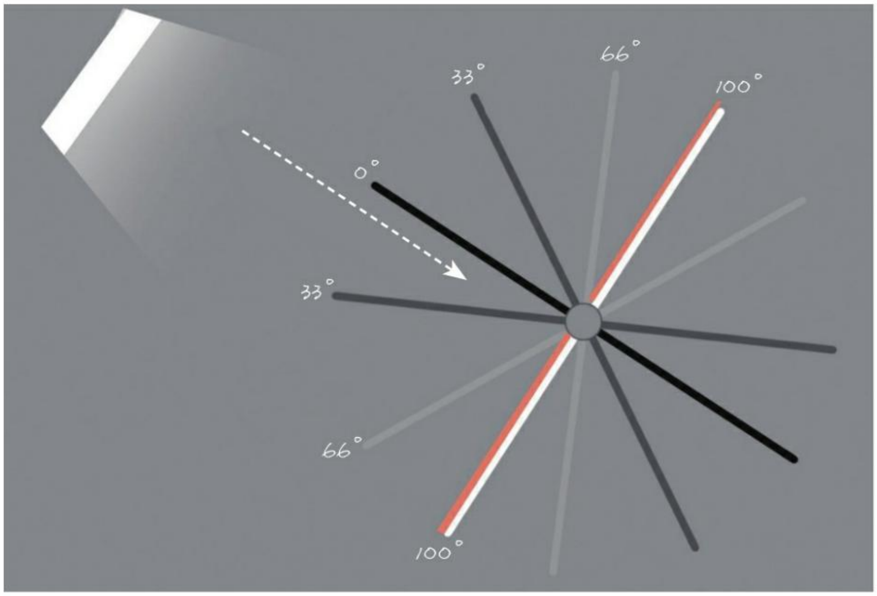


The brightness of light is at its minimum when it is parallel to or away from an object.

By placing the light and shadow meter at a perpendicular angle to the direct light and shadow, the brightness and darkness of the light and shadow can be easily calculated.

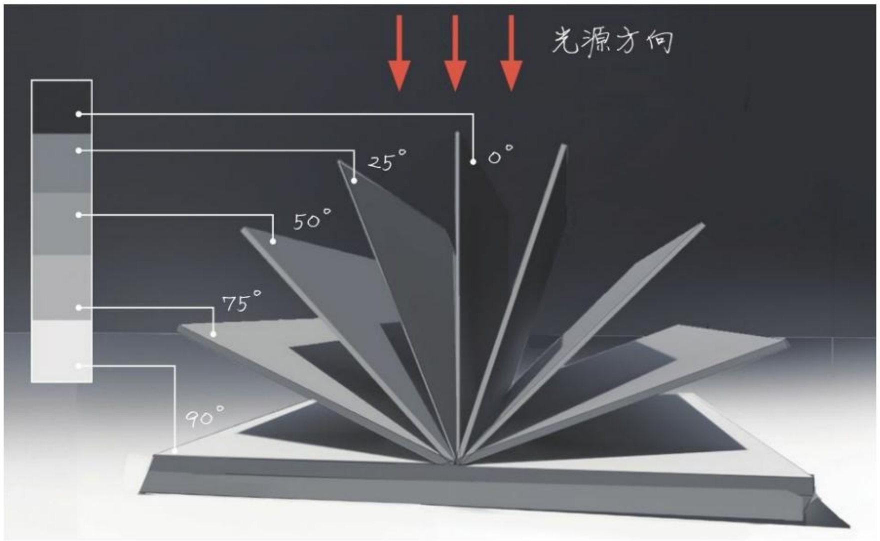
The approximate values are shown in the image below. This method can help us understand the objective laws of light and shadow;

we don't need to worry too much about the accuracy of the values, otherwise we would lose the meaning of painting.



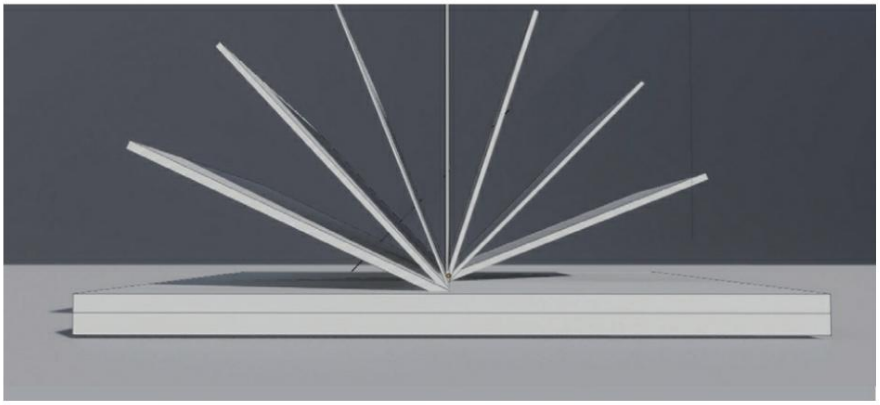
Here, we can take a book, open it, and conduct a lighting experiment in front of a desk lamp. We will find that...

The larger the angle between the paper receiving light and the light (maximum 90°), the stronger the lighting effect; conversely, the smaller the angle, the weaker the lighting effect.



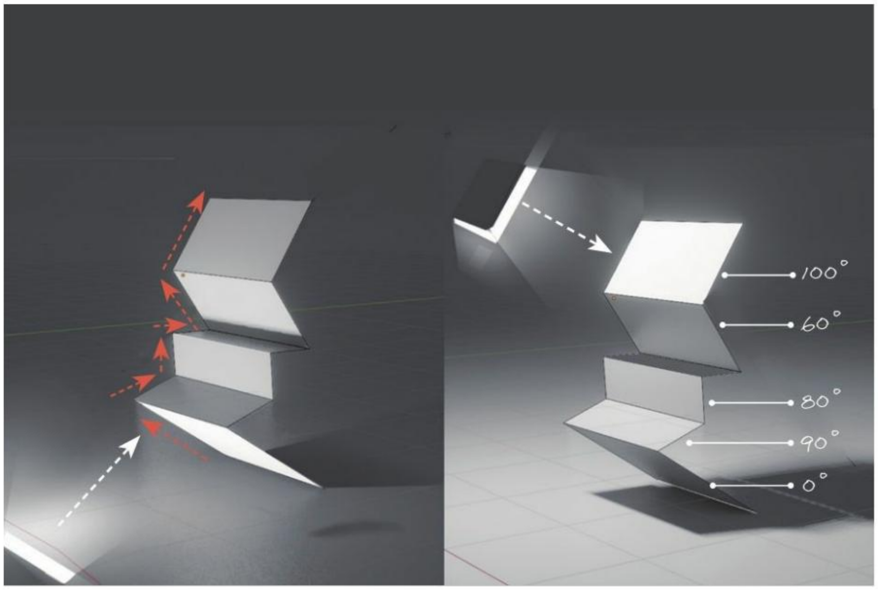
Schematic diagram of color gradation (without considering the attenuation of light)

Based on this principle, we can create a light and shadow measuring device to calculate the relationship between the angle of light reception and the light reception rate.



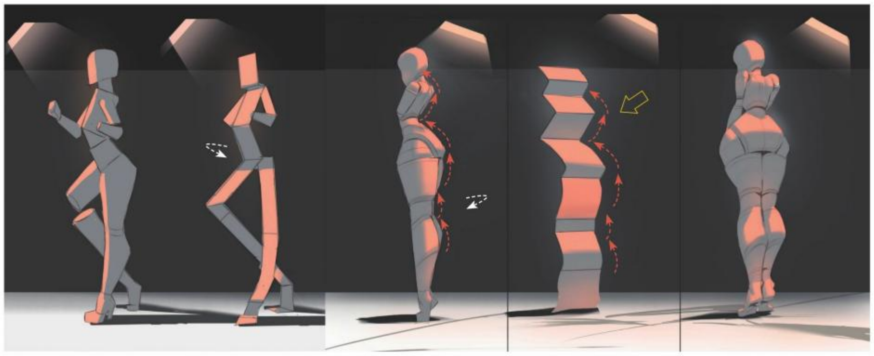
Fold a napkin at different angles and conduct an experiment under a light; you'll also get...

They exhibit the same pattern of light and shadow changes.

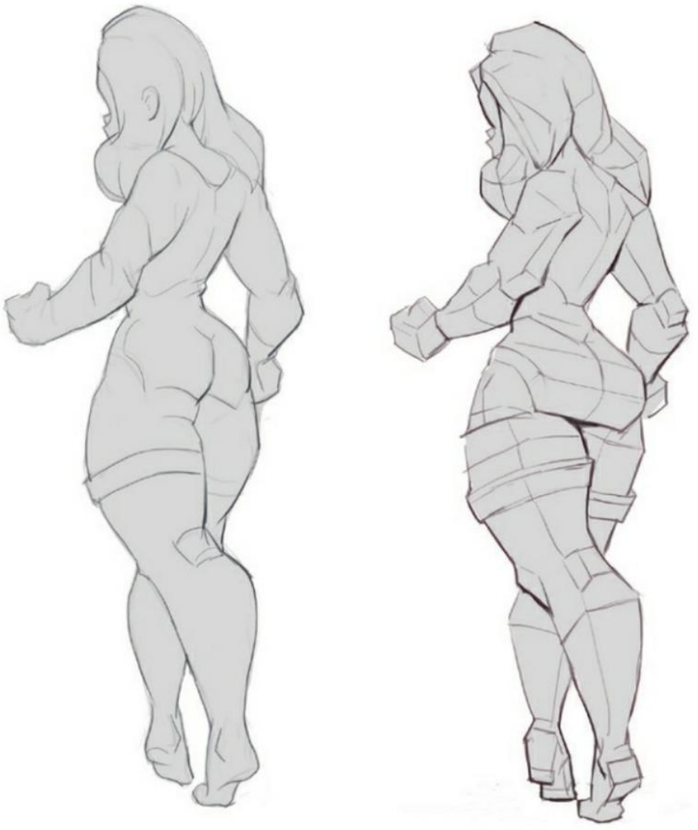


When drawing, you can imagine the structural transitions of an object as napkins with different fold angles, and...

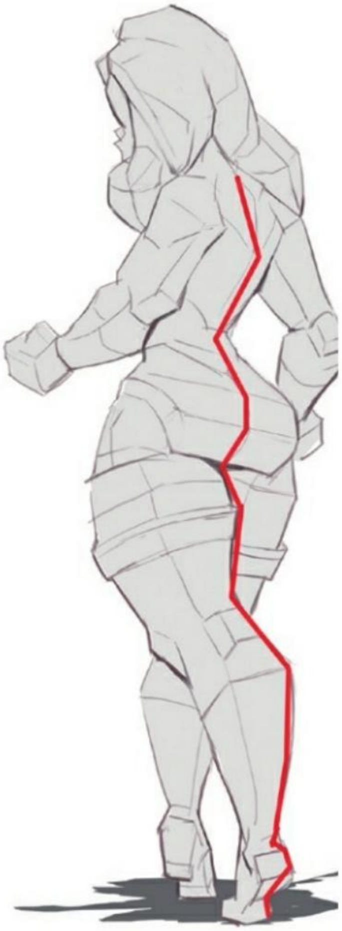
This allows for a better grasp of the rhythm of the entire light and shadow change.

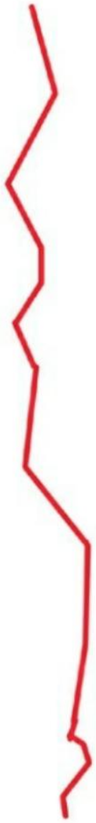


01 The first step in lighting an object is to outline its shape, that is, to break down complex structures into blocks.

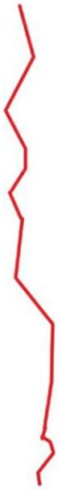


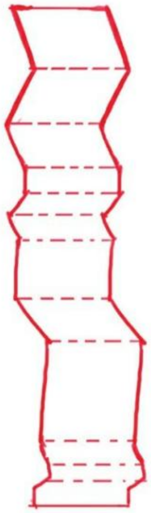
02 Once the shape of the volume is summarized, it is easy to find the turning lines of the structure, which greatly reduces the difficulty of lighting.

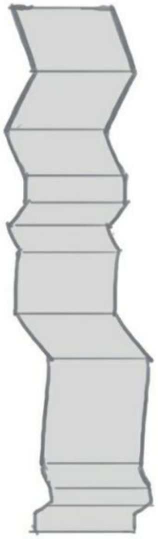




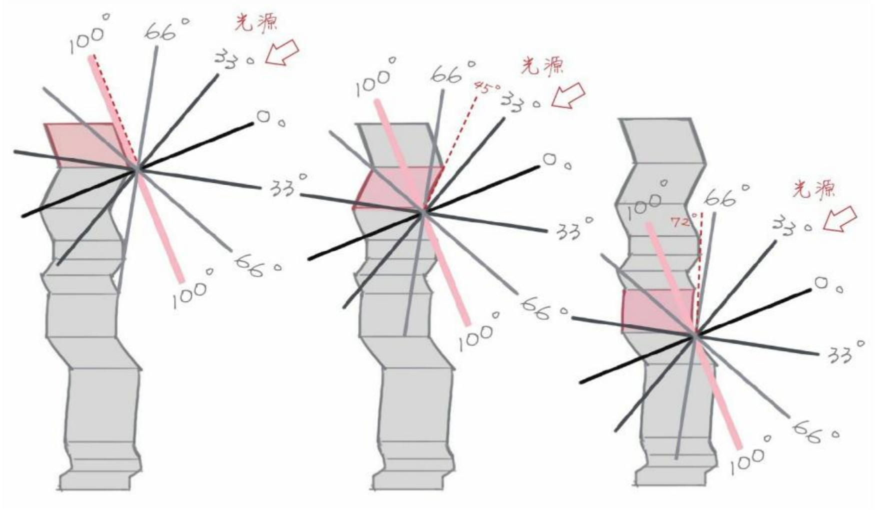
03. Copy the fold lines to get a piece of paper with a rhythmic twist.



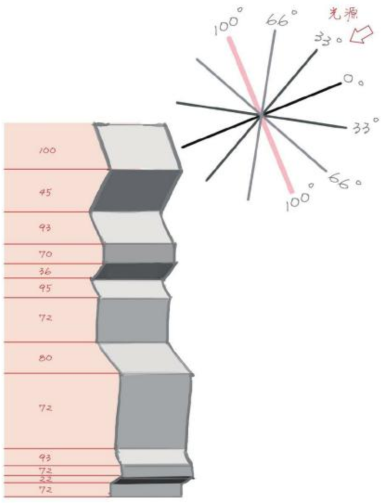


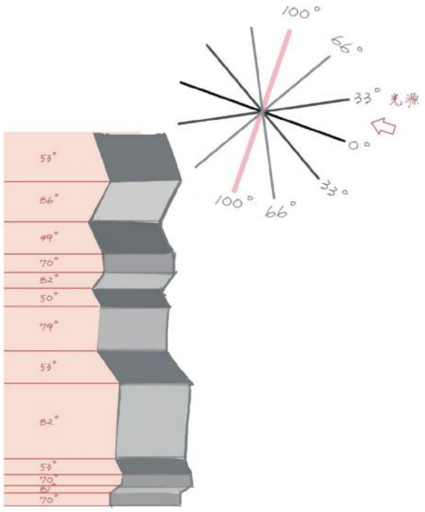


04. Use a light and shadow calculator to accurately calculate the values of light and shadow tones on different surfaces.

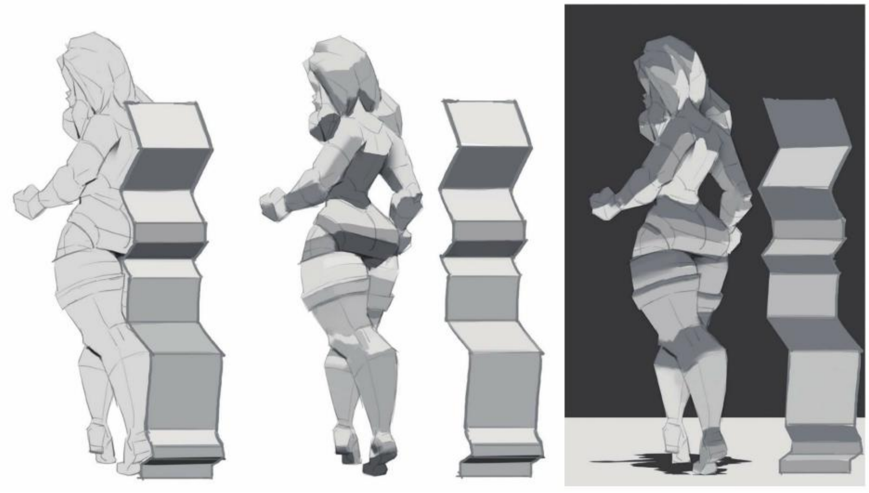

100°
66°
光源
33°
0°
33°
66°
100°
100°
66°
45°
光源
33°
0°
33°
66°
100°
100°
66°
72°
光源
33°
0°
33°
66°
100°

05. The light and shadow calculator can easily calculate the brightness and darkness values of light sources from different angles.


100°
66°
光源
33°
0°
33°
66°
100°
100
45
93
70
36
95
72
80
72
93
72
22
72


100°
66°
33°
光源
0°
33°
66°
100°
53°
86°
49°
70°
82°
50°
79°
53°
82°
53°
70°
81°
70°

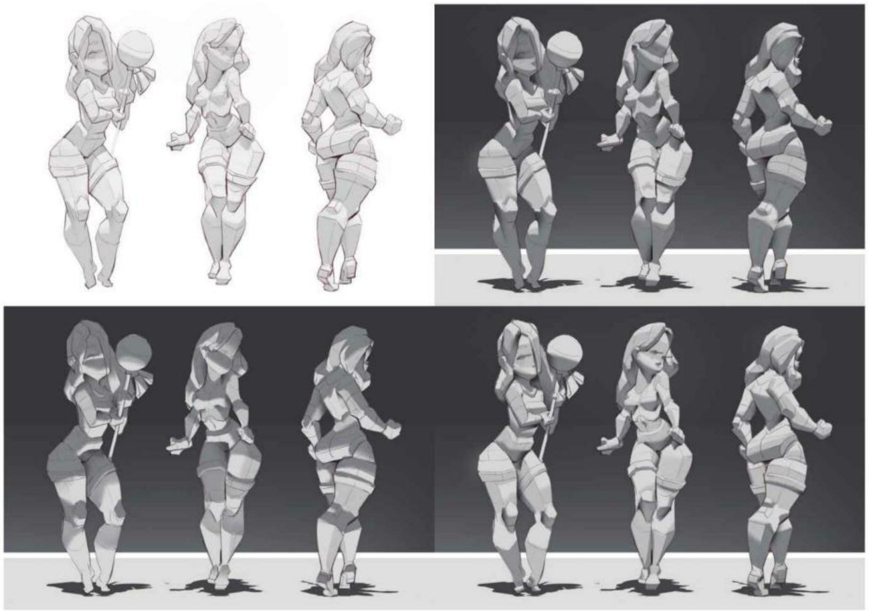
06 After obtaining different light and shadow values, directly apply them to the human body to be lit to get a relatively accurate light and shadow image of the human body.

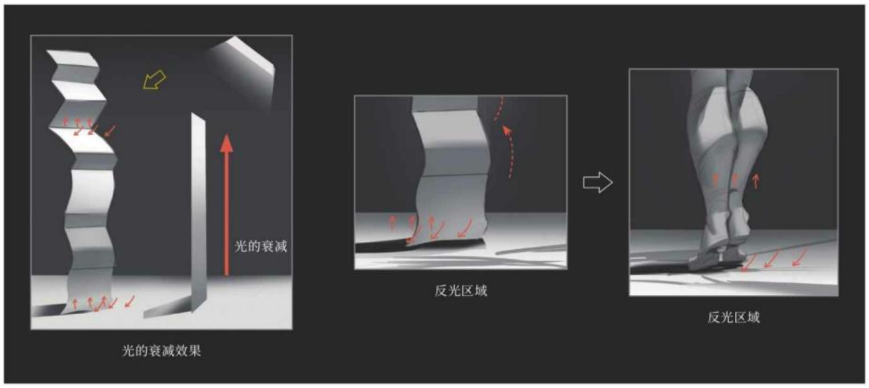


To draw a good human figure with light and shadow, follow these four steps:

Step 1: Draw the correct shape. Step 2: Summarize the volume based on the correct shape. Step 3: Use a light and shadow calculator to calculate different brightness and shading values according to different light and shadow angles. Step 4: Apply the obtained brightness and shading values to the various surfaces of the human figure to complete the basic figure drawing.

The volumetric light and shadow.





After learning the above knowledge of light and shadow, we can clearly represent the light and shadow of the human body according to the different angles of light received on the human body surface, and draw rich tones.

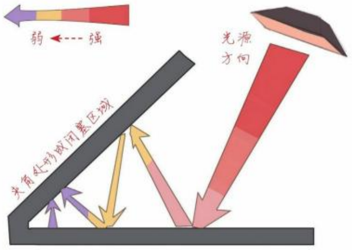
Speaking of light and shadow, we need to explain the concept of "occlusion" in detail. Many learners may only

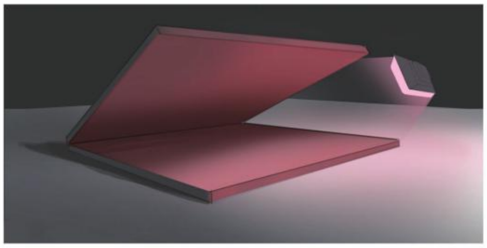
have heard of the three planes and five tones, but in actual painting, "occlusion"...

"Blocking" is also a very important concept. Simply put,

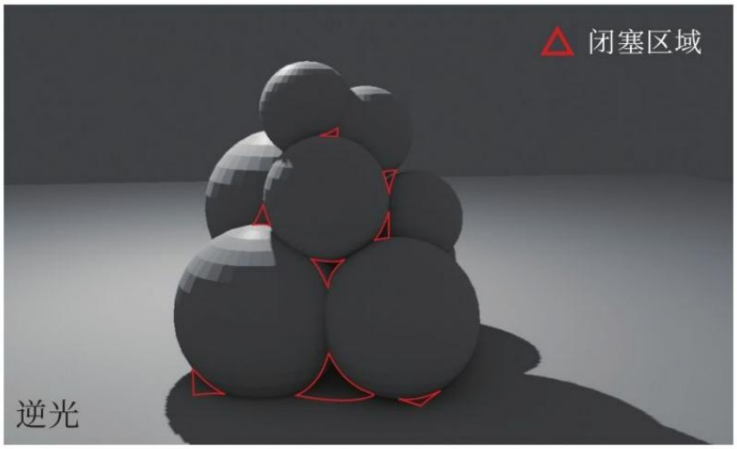
when objects are close enough together, they block light, preventing light from reaching the objects.

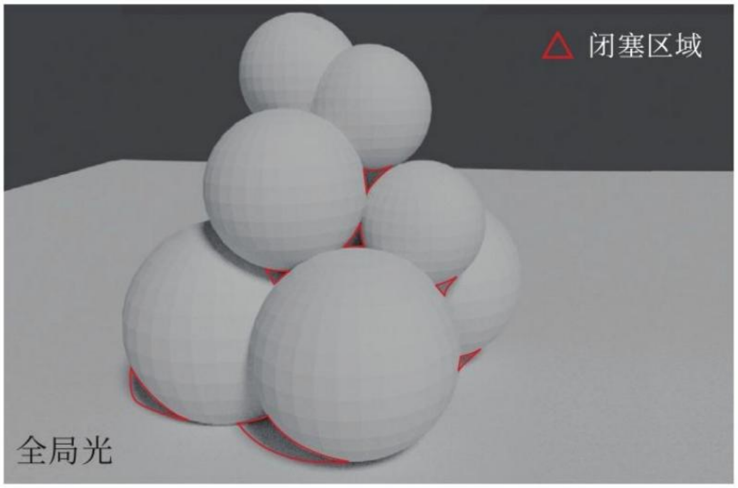
There is no real contact between them, and closed shadow areas will also appear.

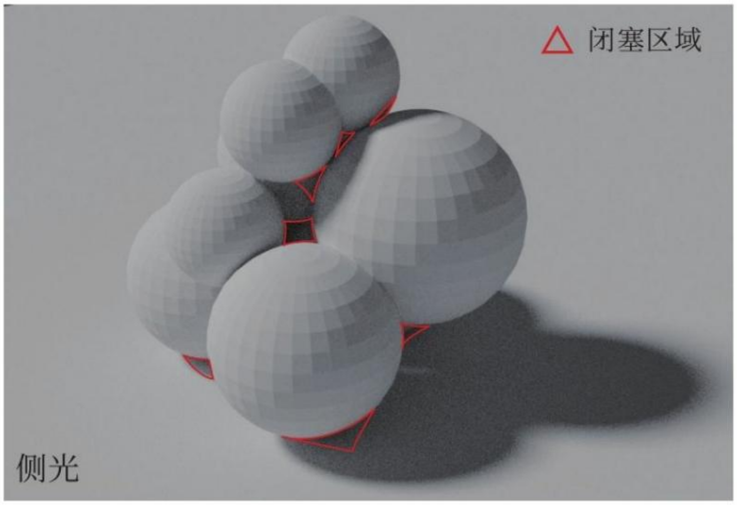




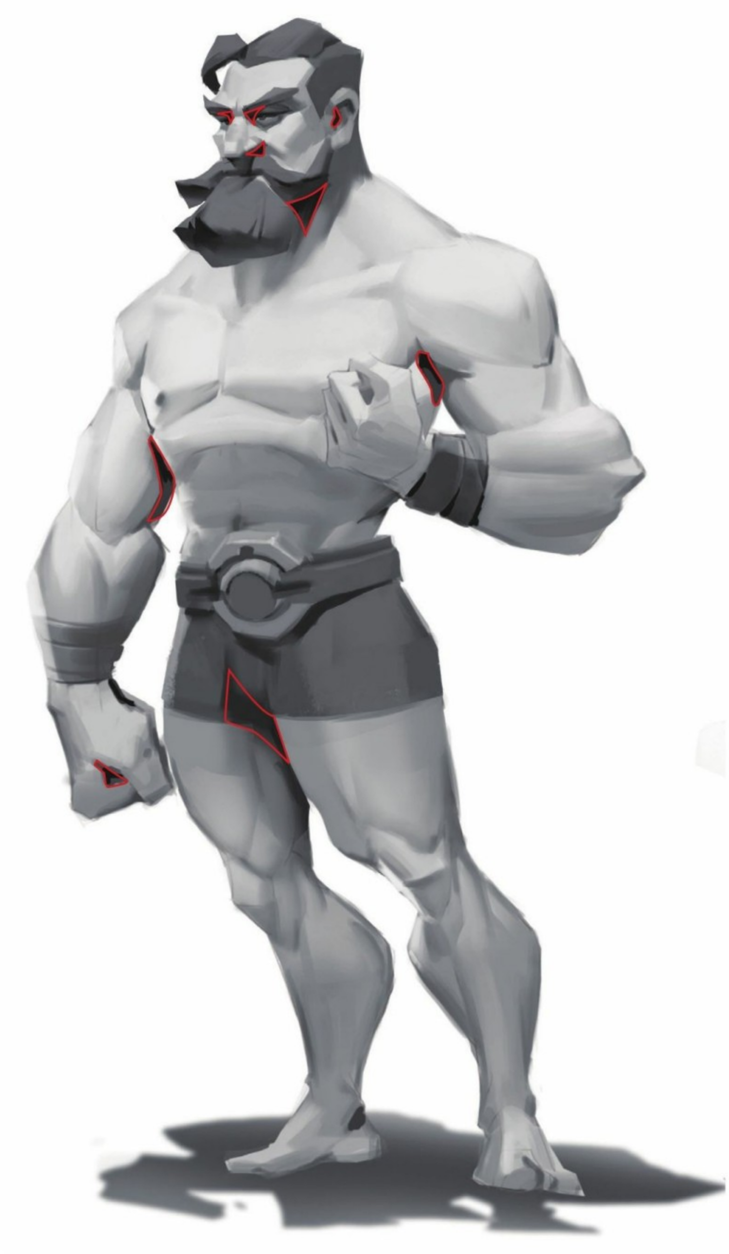
The three images below show the occluded shadow areas formed under different angles and light sources. If you observe the dark areas of these objects carefully, you will find that the tones at the corners of each object (see red areas) are the darkest in the image, and these darkest areas are the occluded shadow areas.

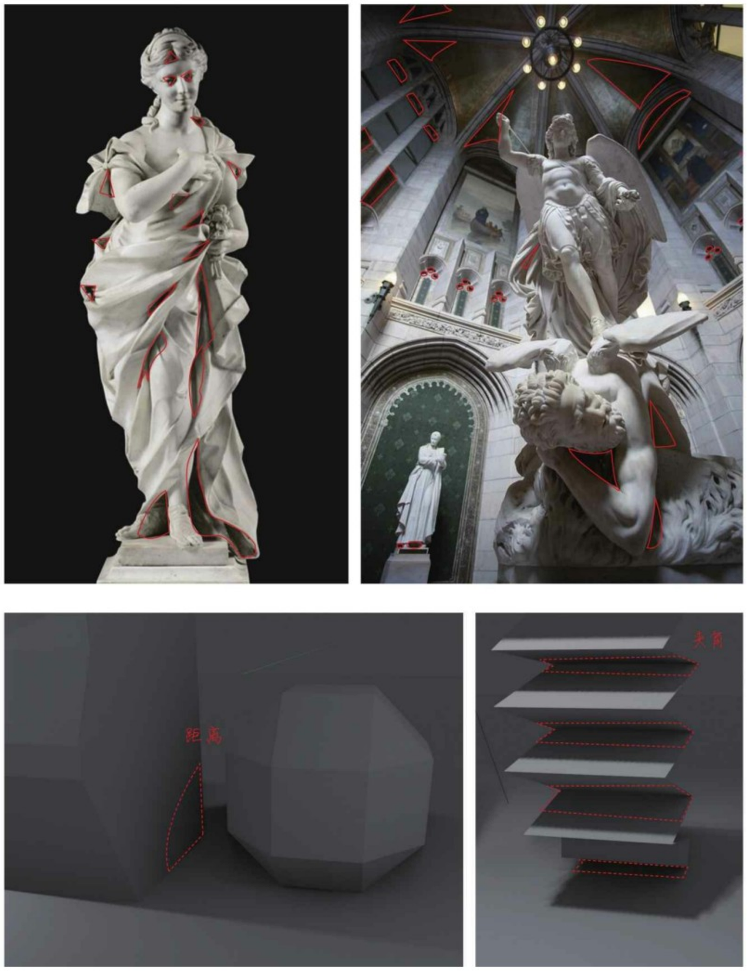






The concept of "occlusion" is applied to the shaping of human body light and shadow, as illustrated below.



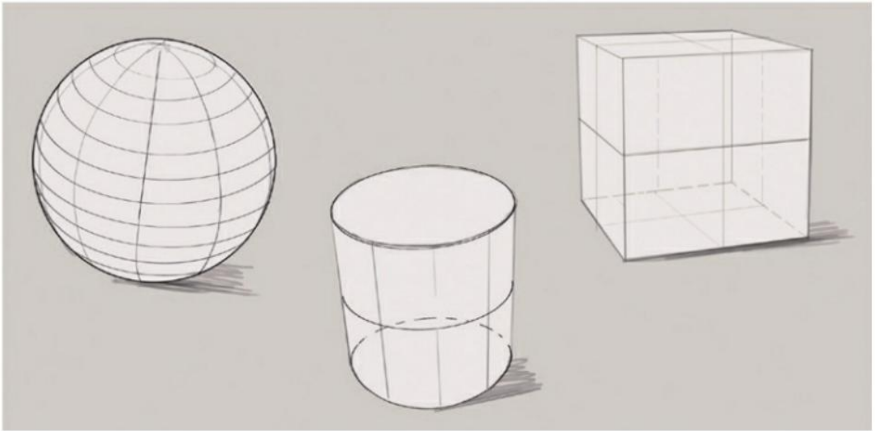

距离
夹角

8.2 Shaping of Light and Shadow

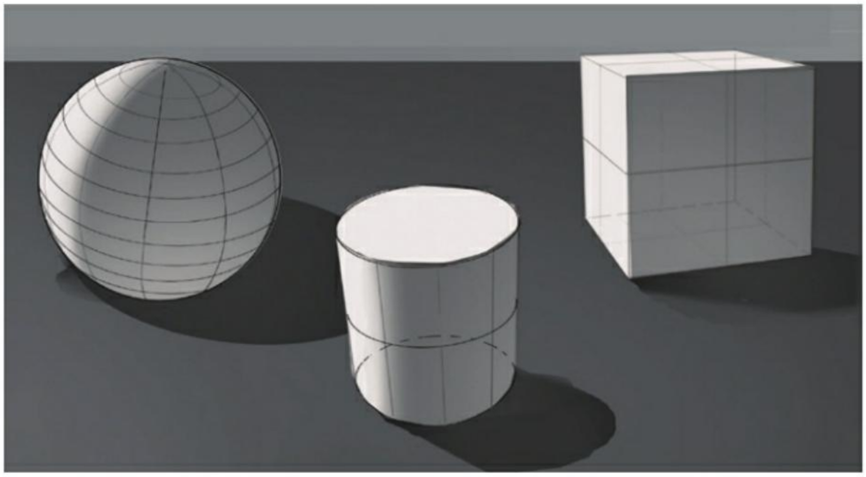
In this section, we will learn how to start with geometric shapes, using the light and shadow effects of simple spheres, cylinders, and cubes to summarize the human form, and then learn how to create light and shadow effects by comparing the shapes with the lighting and shadow effects.

8.2.1 Spatial Geometry

Sketching is about drawing light and shadow, but to draw the correct light and shadow, you must grasp the concept of volume behind the object. Shaping light and shadow starts with understanding spatial geometry.



Volume concept diagram

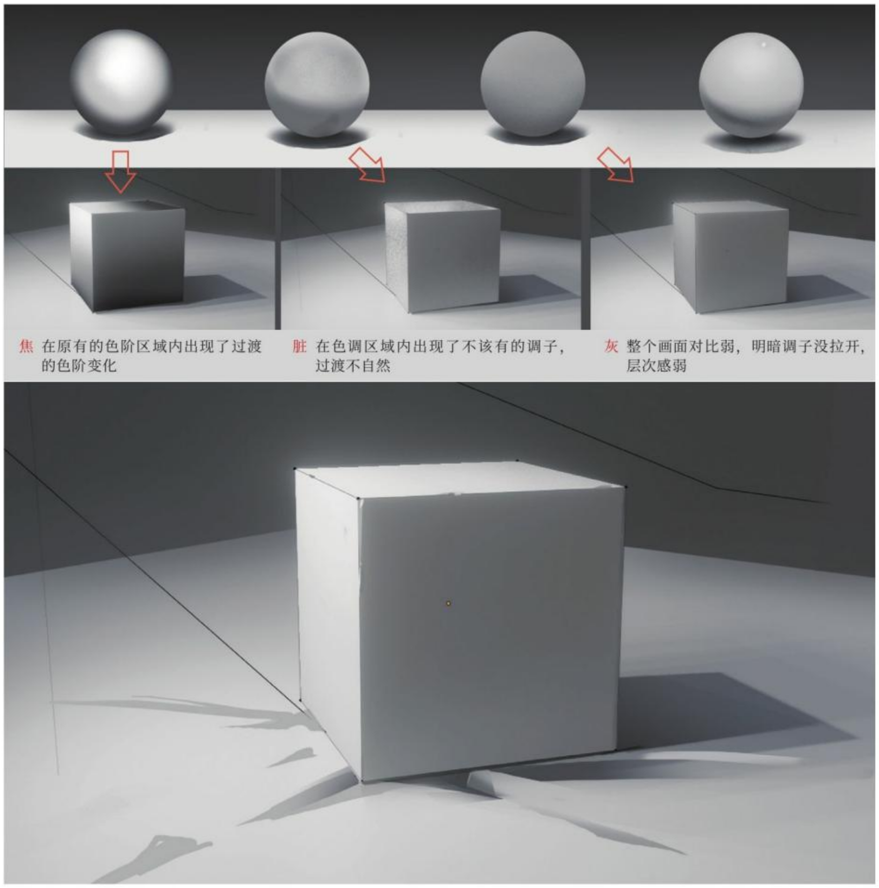


Light and shadow concept art

The structural lines in the volume concept diagram will affect the lighting and shadow tones in the lighting and shadow concept diagram.

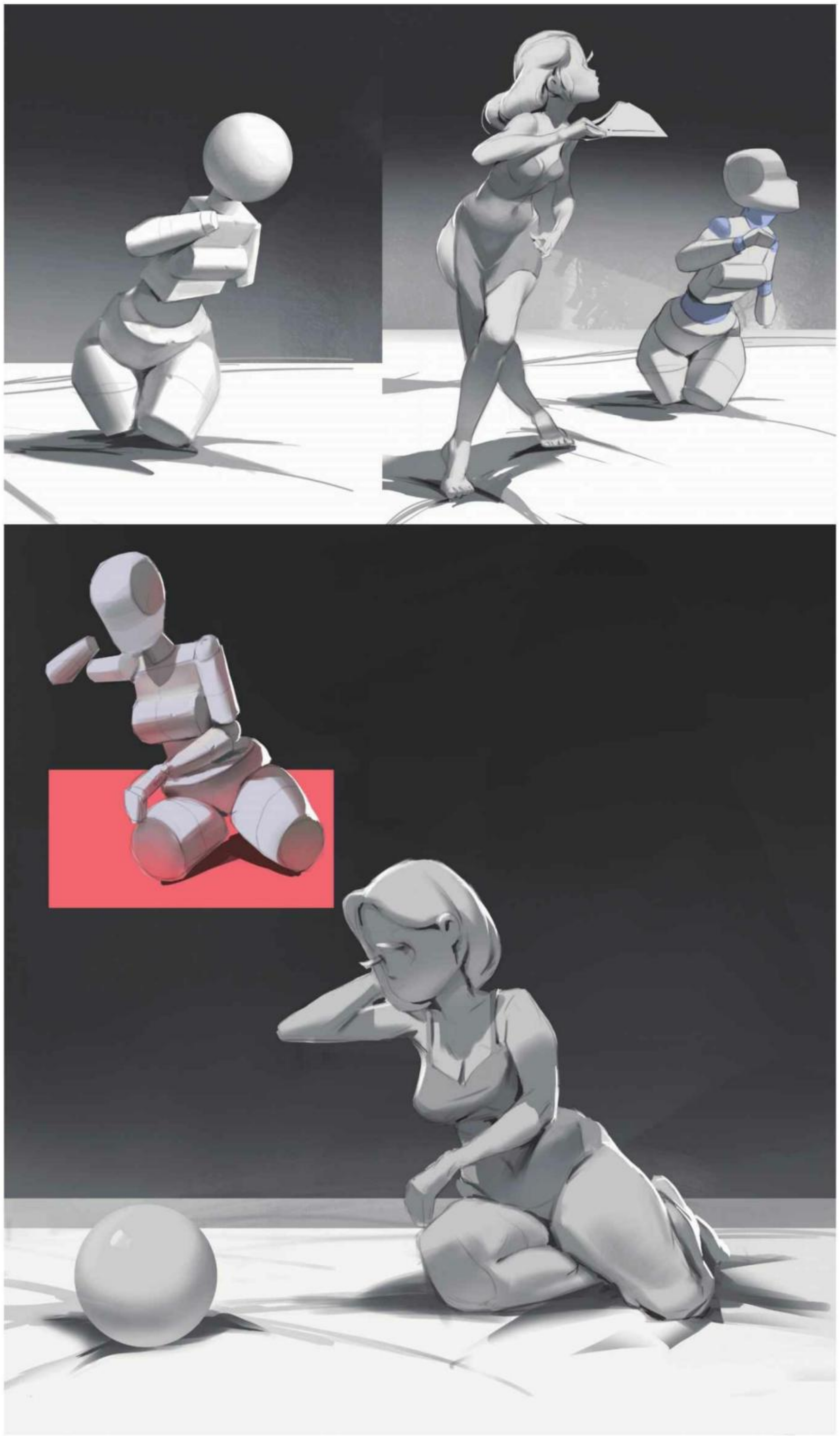
The boundary line between light and shadow will follow the trend of the structural lines. The

following are common mistakes made when practicing light and shadow in basic sketching.


焦 在原有的色阶区域内出现了过渡的色阶变化
脏 在色调区域内出现了不该有的调子，过渡不自然
灰 整个画面对比弱，明暗调子没拉开，层次感弱

After learning about the lighting and shadow modeling of simple geometric shapes, we will now compare these simple geometric shapes with the human body.

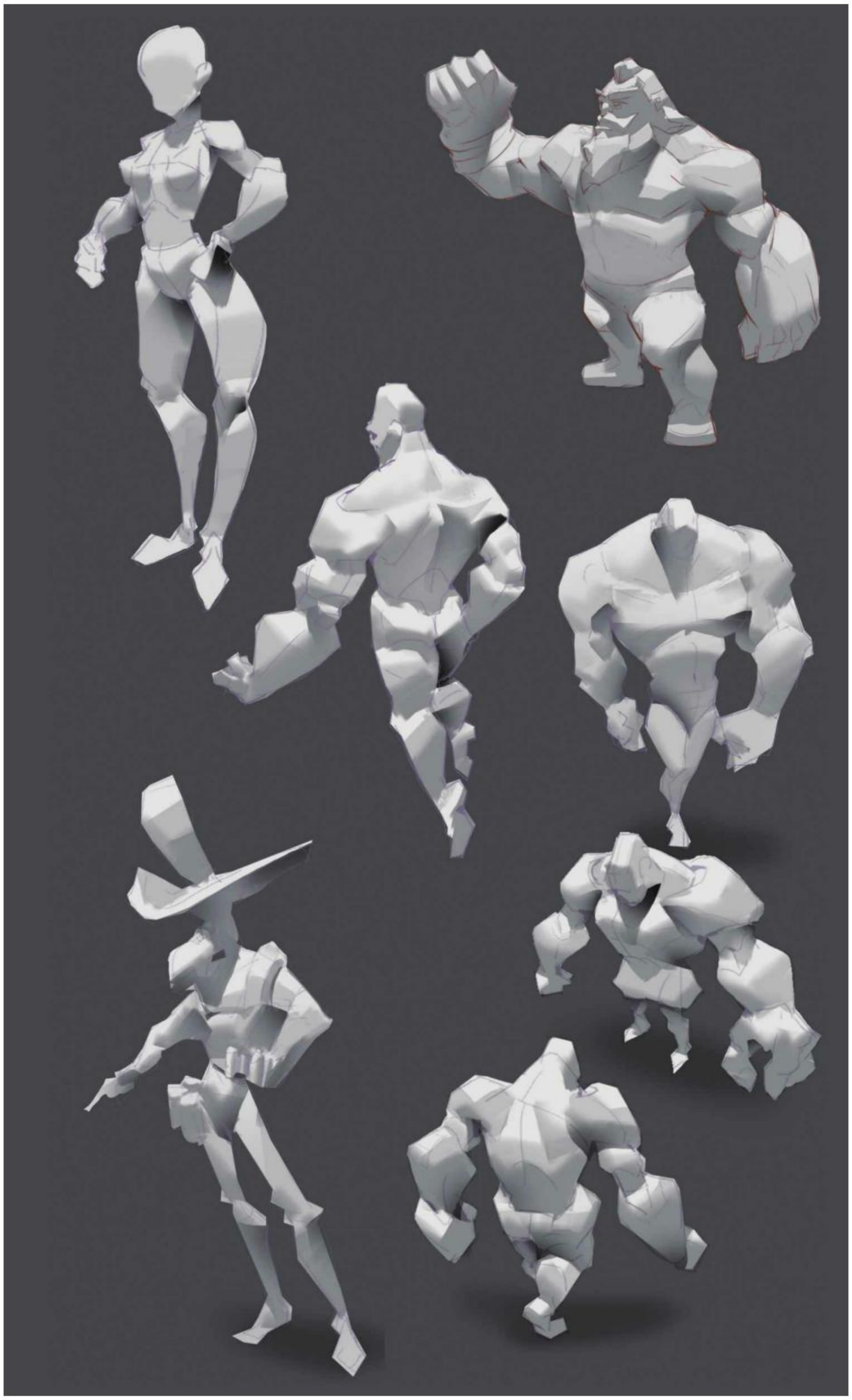
By combining geometric shapes, the three-dimensionality of the human body can be created.



hint

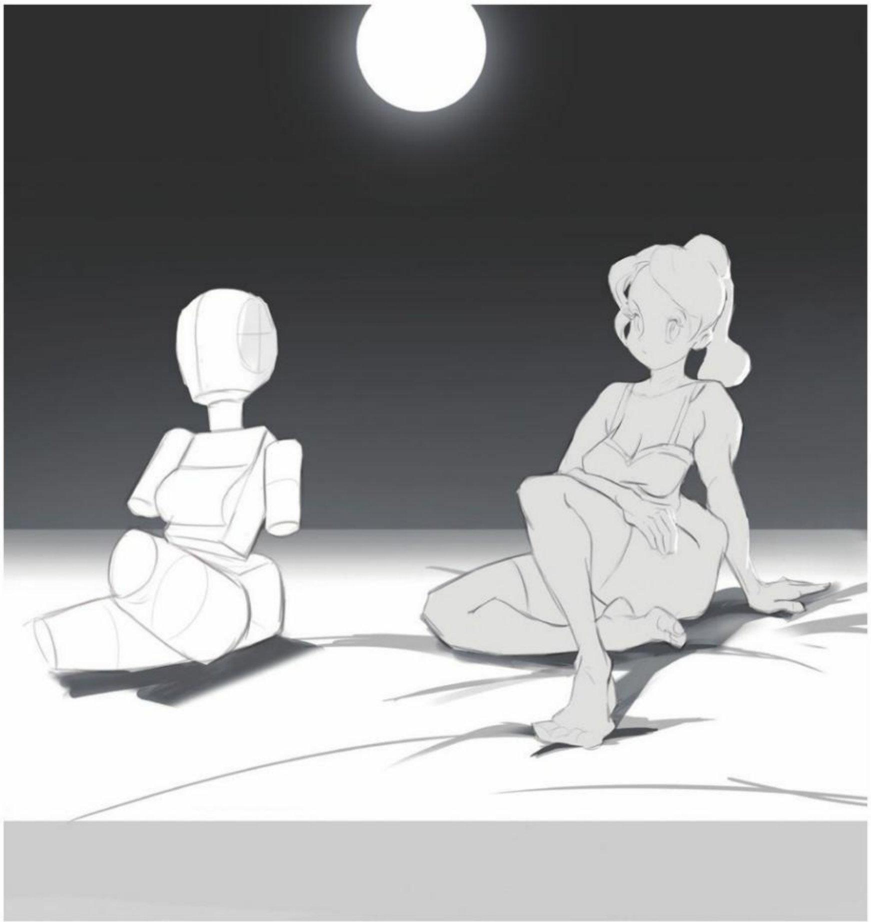
The key is to first show the relationship between the large planes. On the basis of the large plane relationship, you can refine the light and shadow changes of the fine structure to make the picture more balanced.

The light and shadow formed by simple geometric shapes can also be used to represent muscle blocks as shown below.

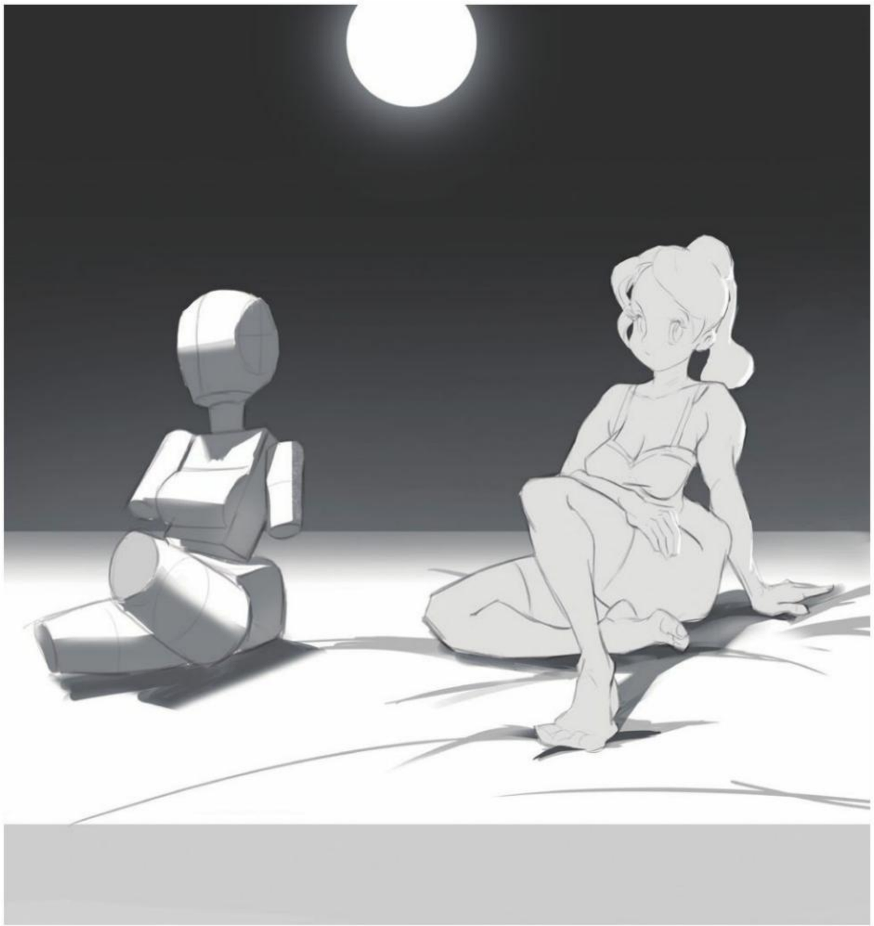


Below, we will use a case study to demonstrate how to create light and shadow on the human body.

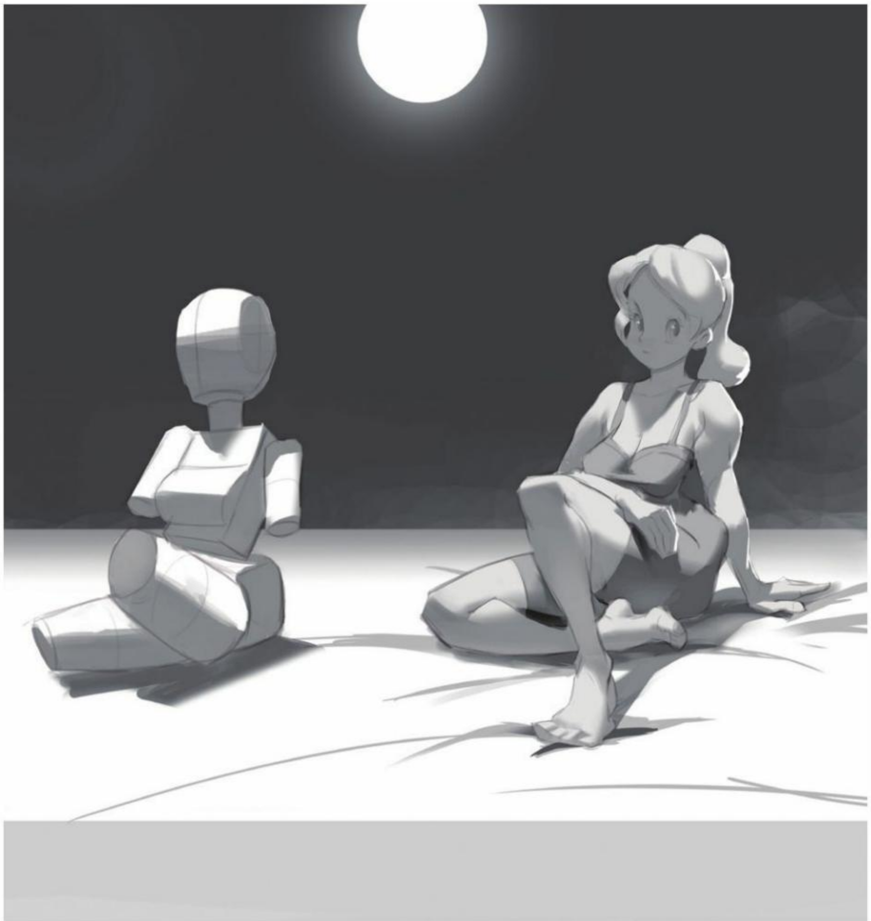
01. Set a light source direction for the basically drawn human figure, and then do the basic coloring.



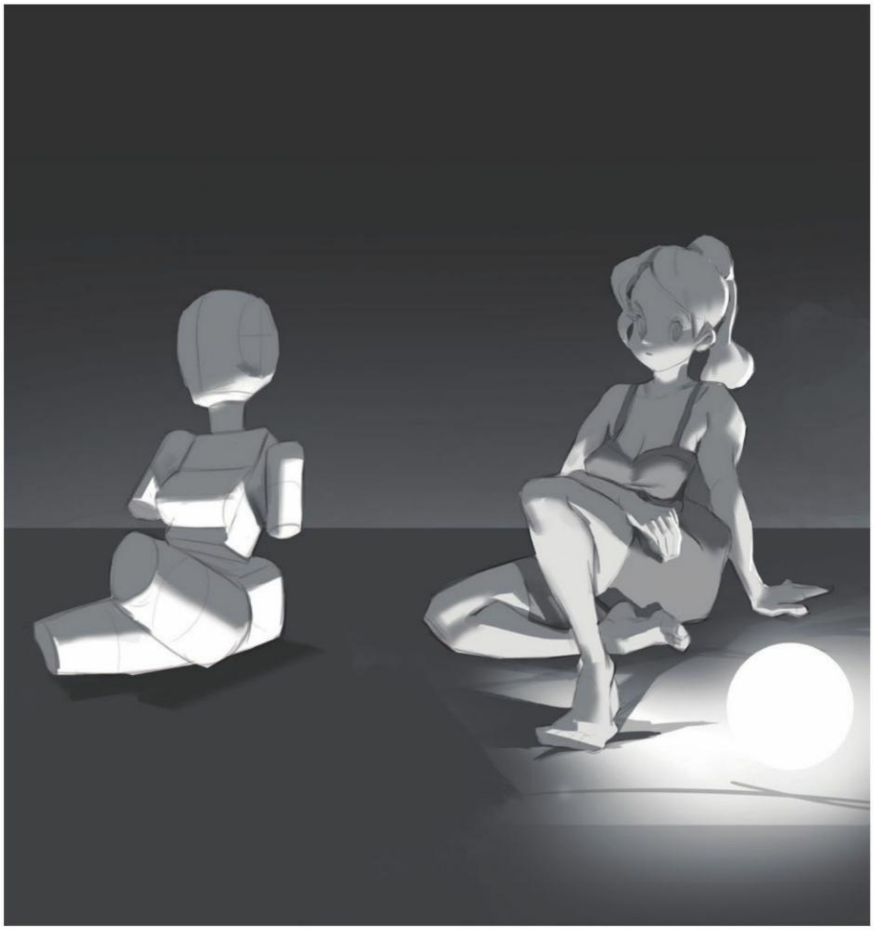
02 Before shaping the human body's light and shadow, we can make a rough summary and analysis of the light and shadow on the puppet composed of simple geometric shapes to clarify our thinking.



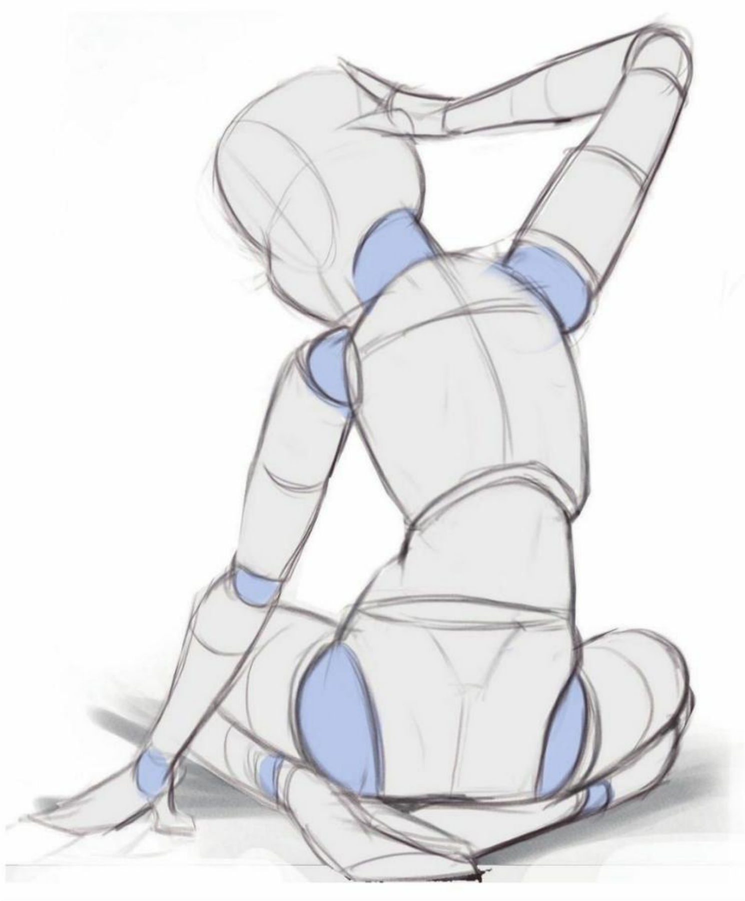
03 Based on the analysis in the previous step, perform a complete light and shadow modeling of the human body.



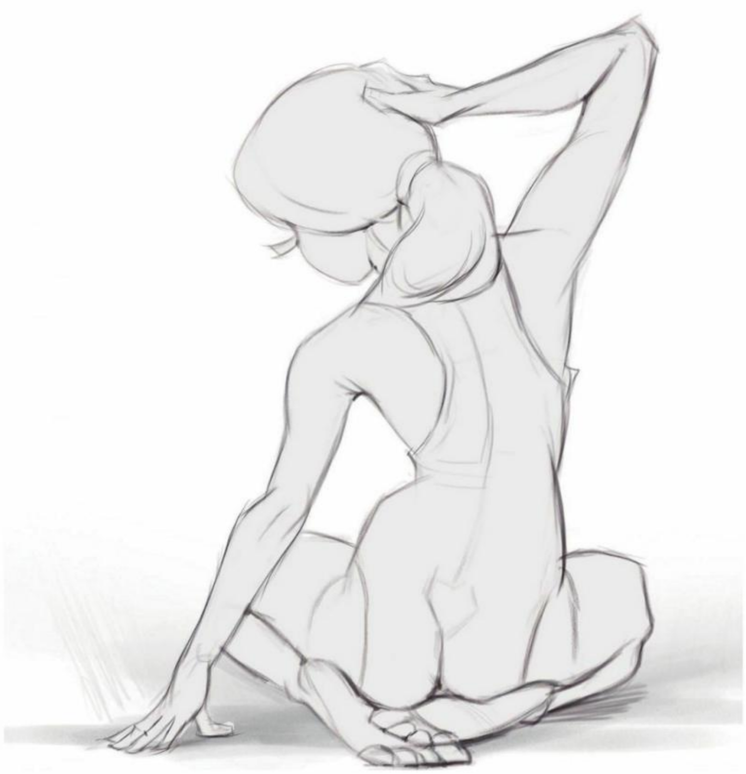
04 After understanding the relationship between structure and light and shadow, you can try changing the direction of the light source to shape the light and shadow.



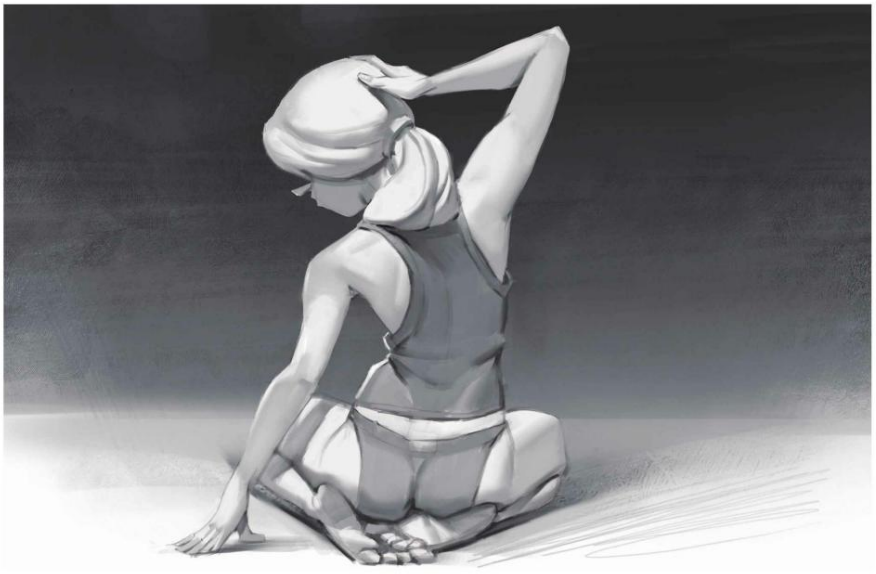
In actual painting, we can first draw a structural joint human model with a strong sense of three-dimensionality, then express the human form on the basis of it, and then create the light and shadow of the human body on the basis of the human form.



Structural joints



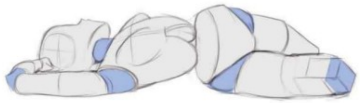
Human figure

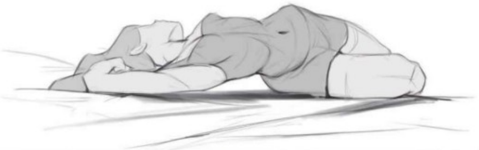


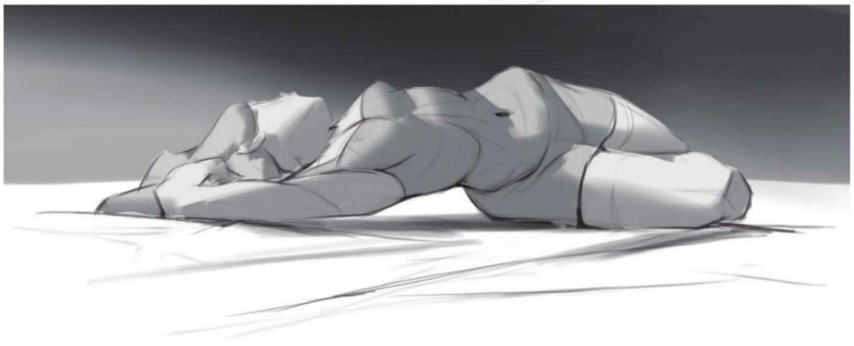
Light and shadow shaping effects

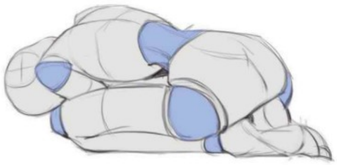
Following the above painting logic, we can depict more different poses and different lighting conditions.

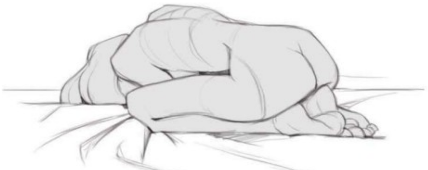
The human body under light and shadow.

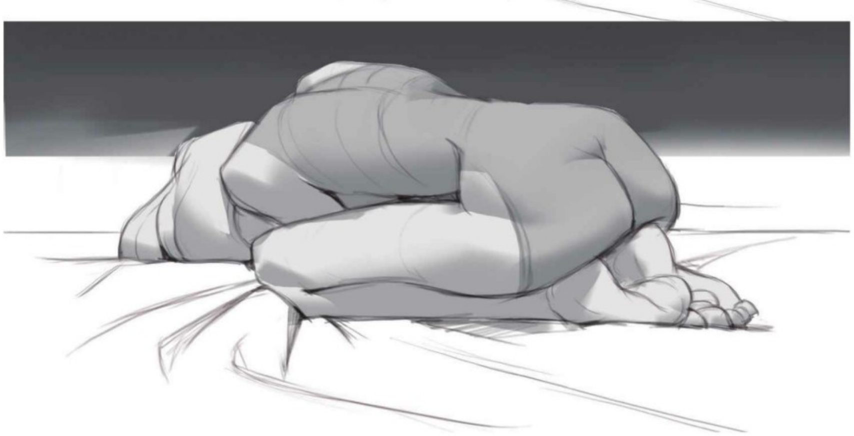


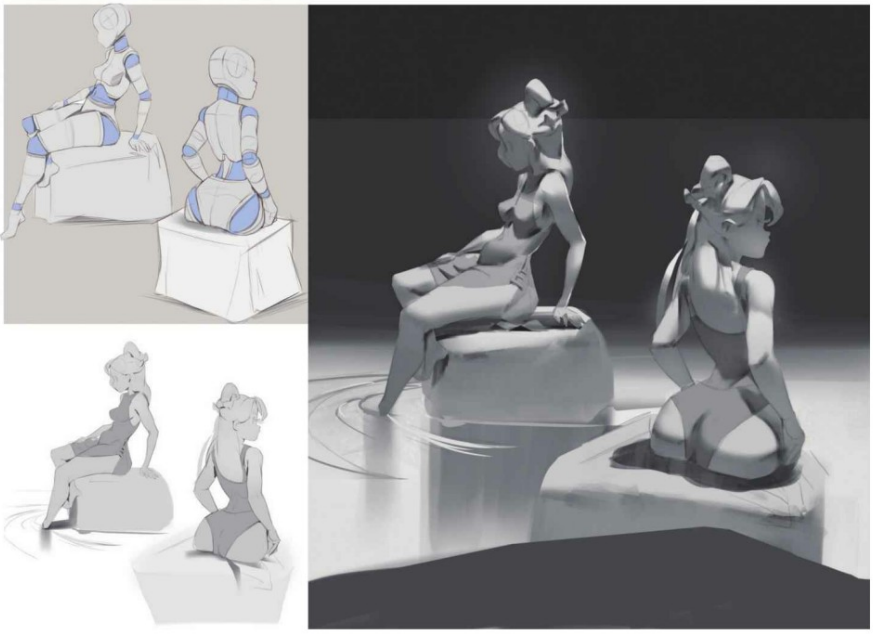


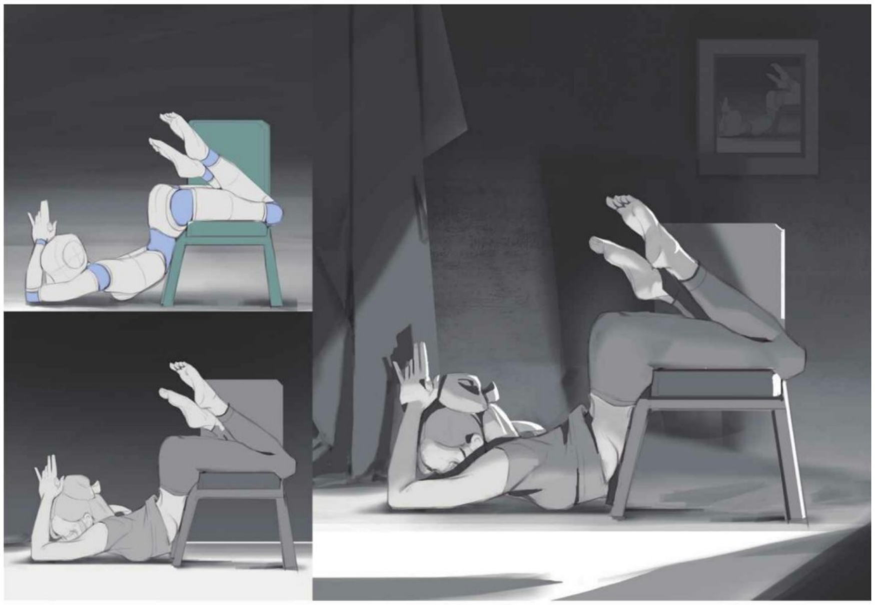


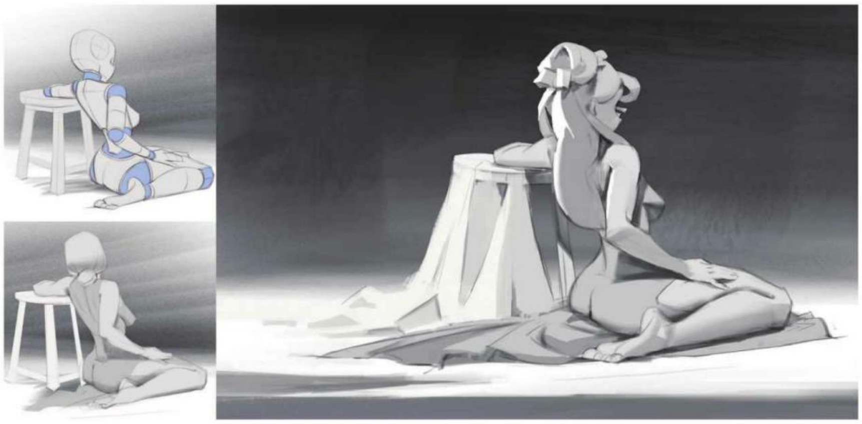


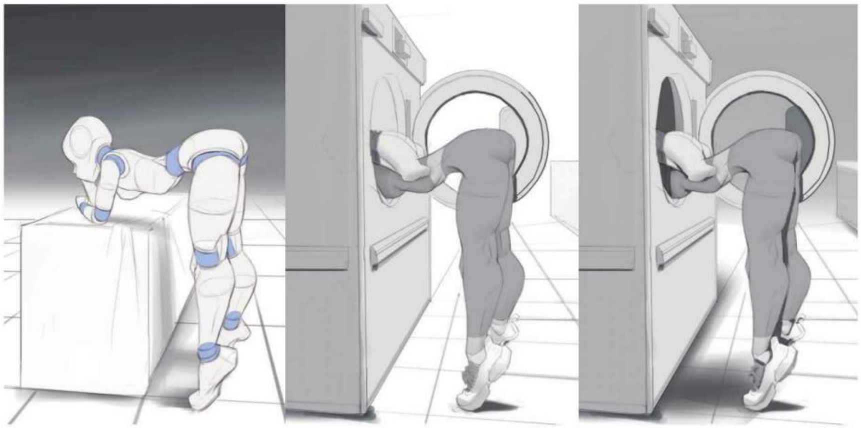


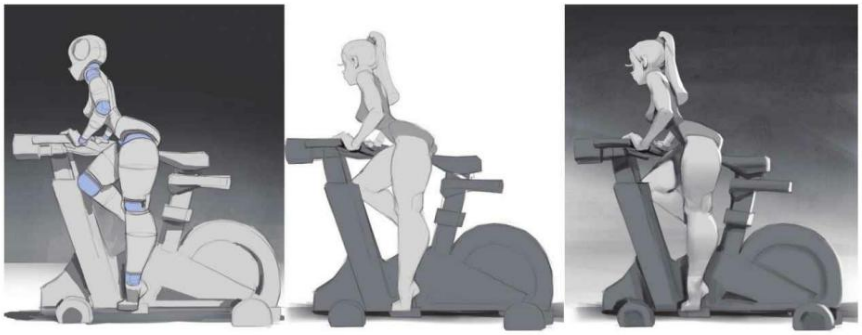






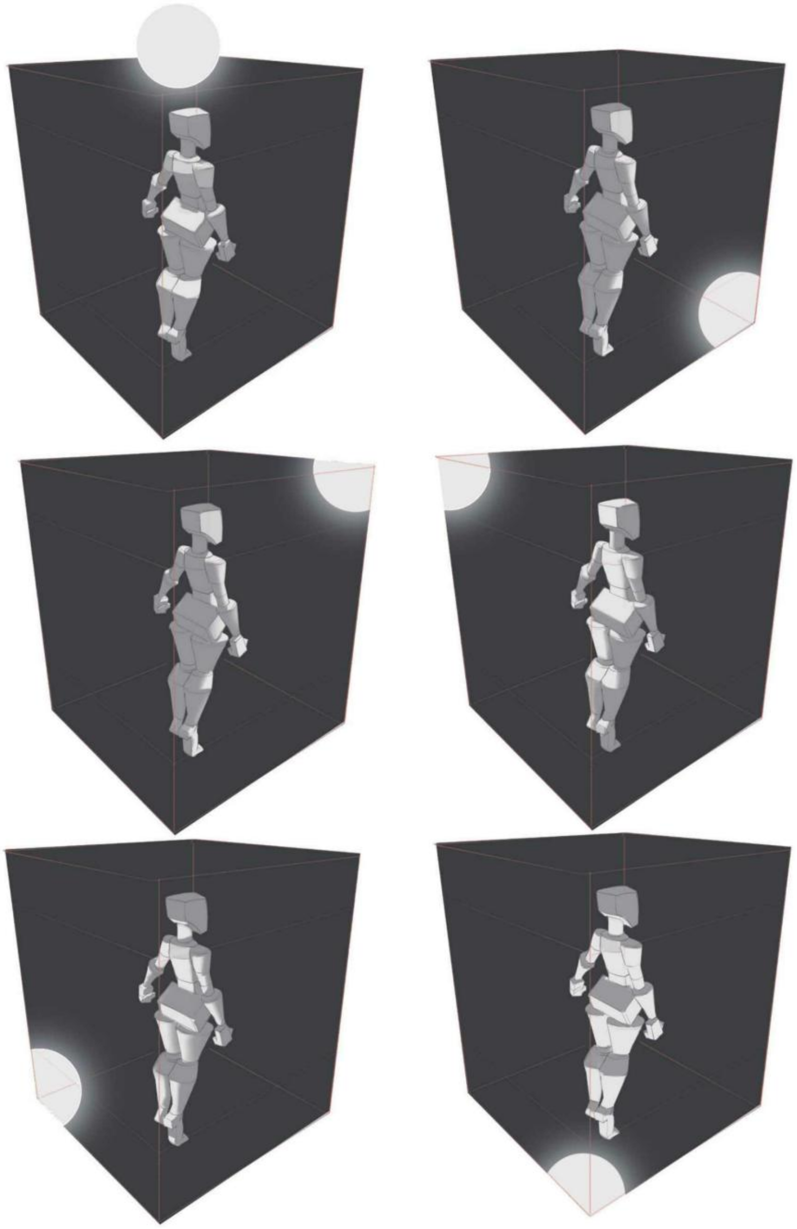




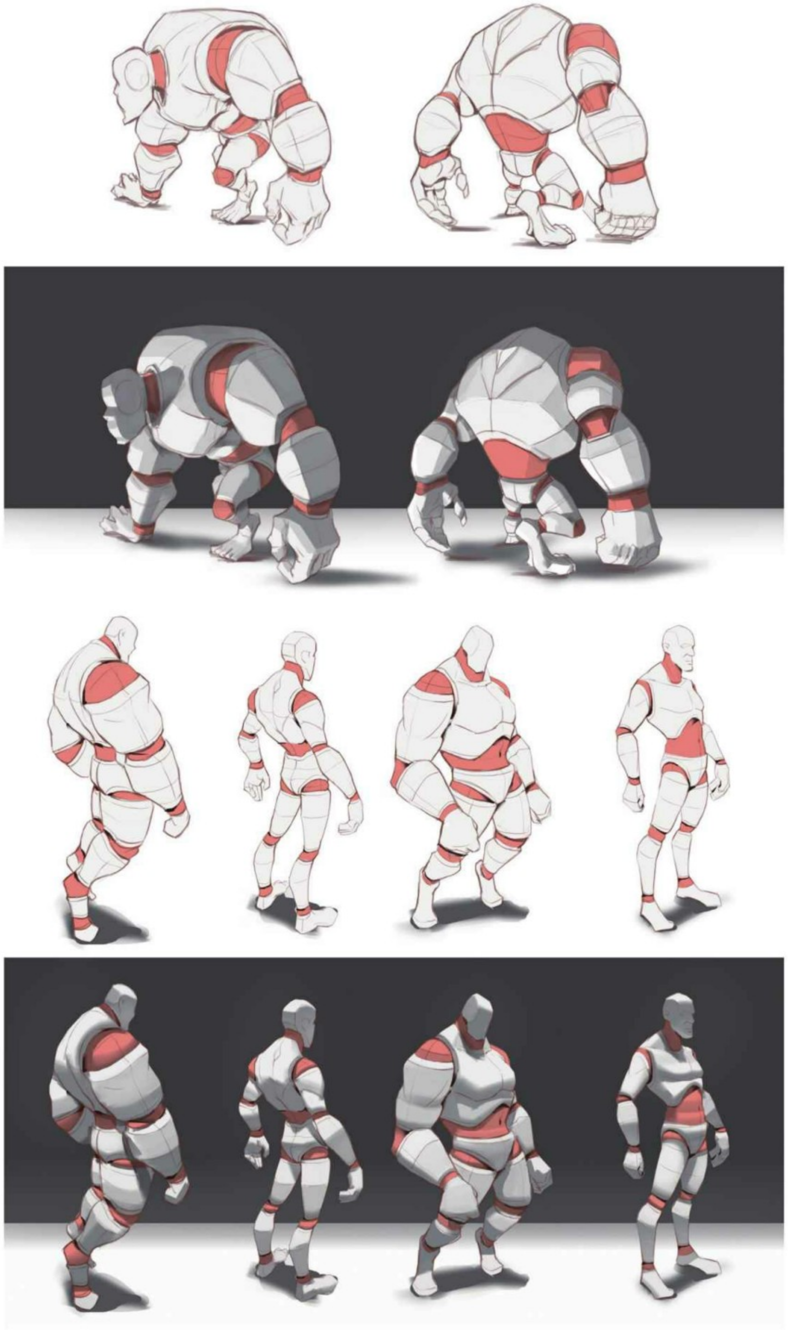


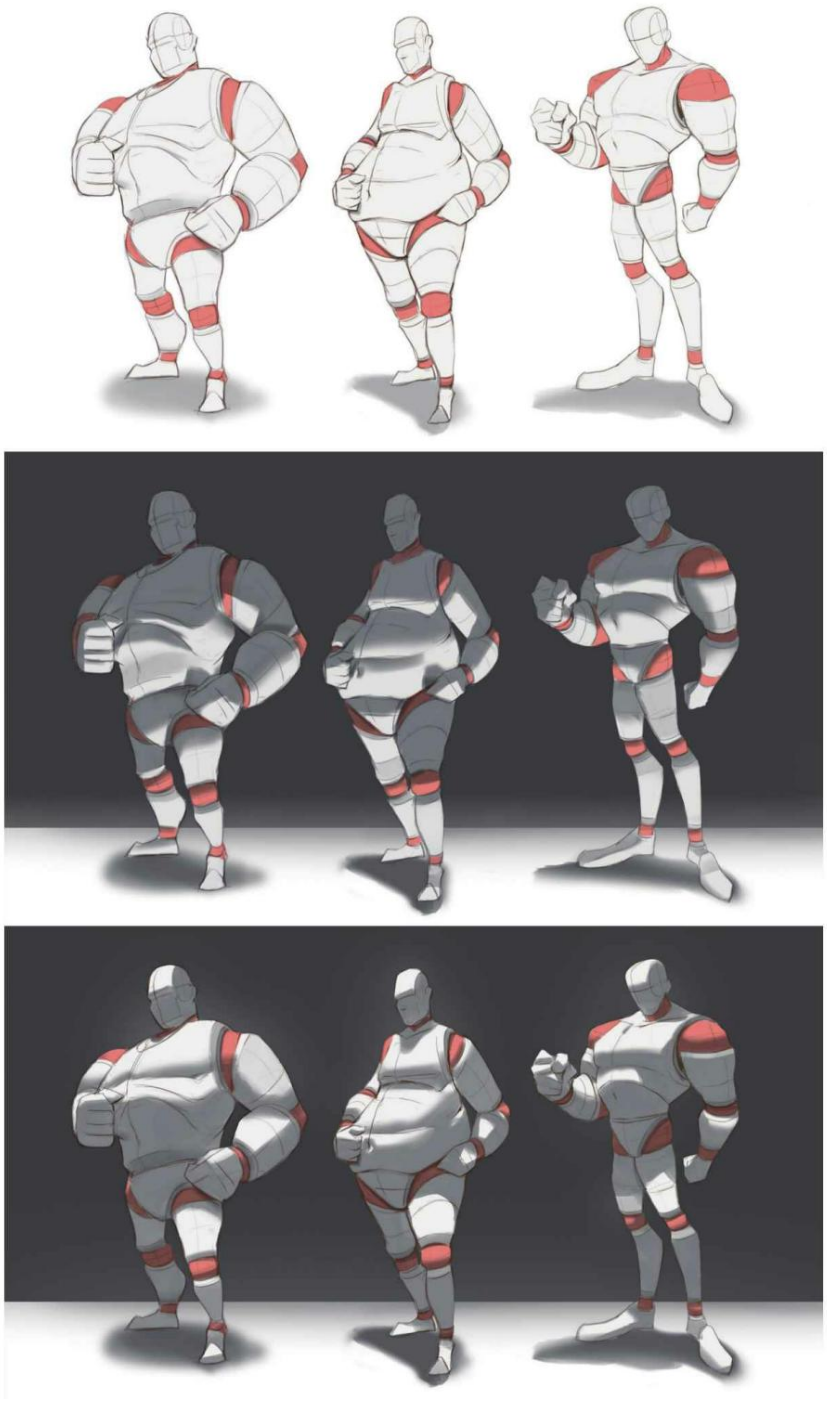
8.2.2 Human body lighting and shadow representation under different light sources

Having learned the knowledge from the previous section, everyone has gained a certain understanding of light and shadow shaping. Next, we will analyze the light and shadow on the human body in more depth based on the different directions of light, in order to further understand the impact of light sources from different directions on the effect of light and shadow on the human body.



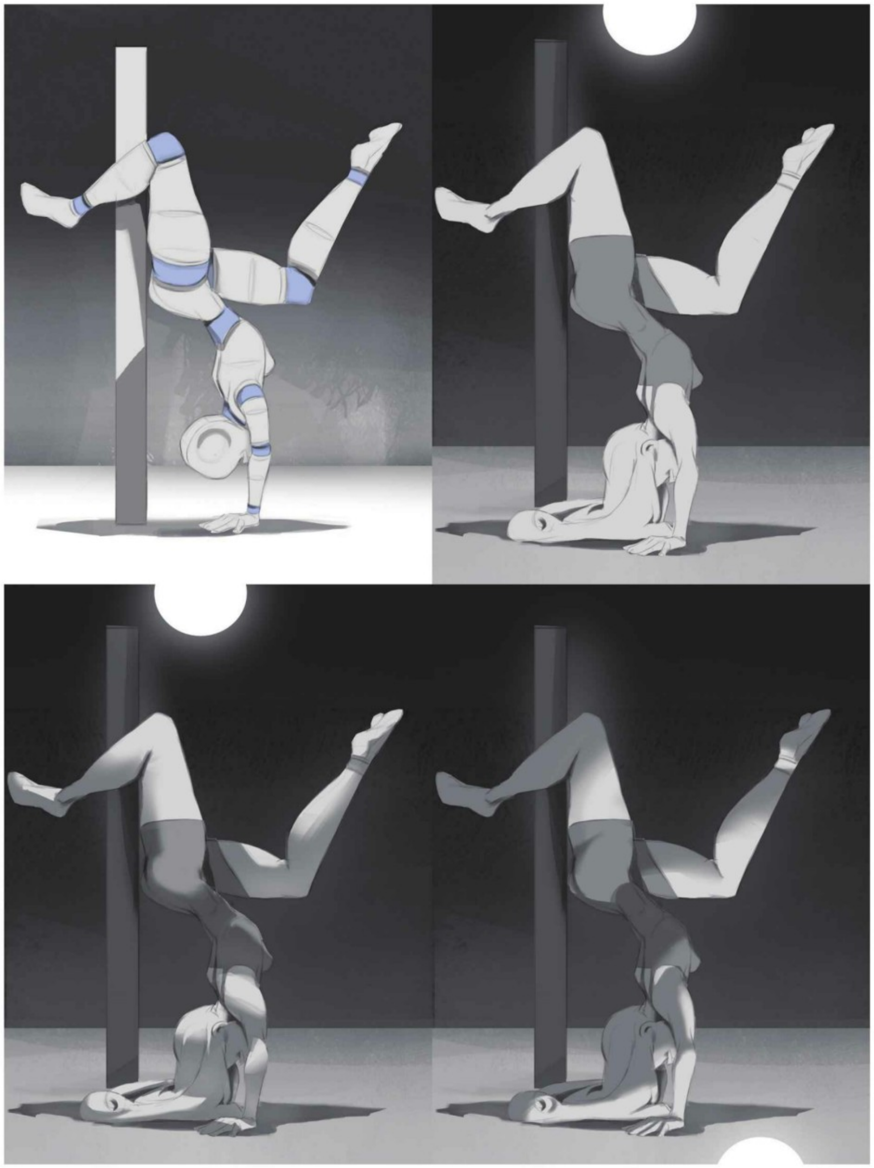
We can set a light source direction based on the structural joint mannequin and then perform light reception analysis on it.

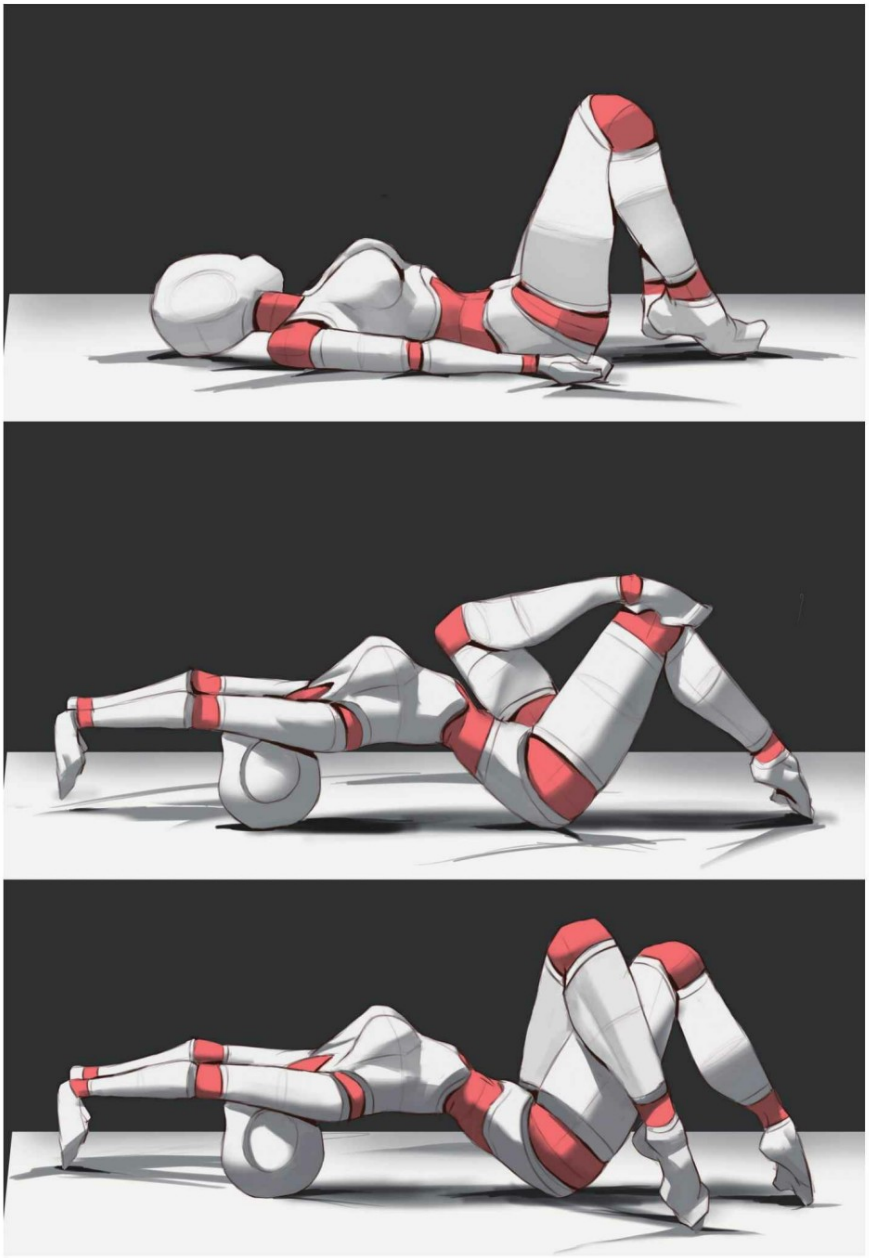


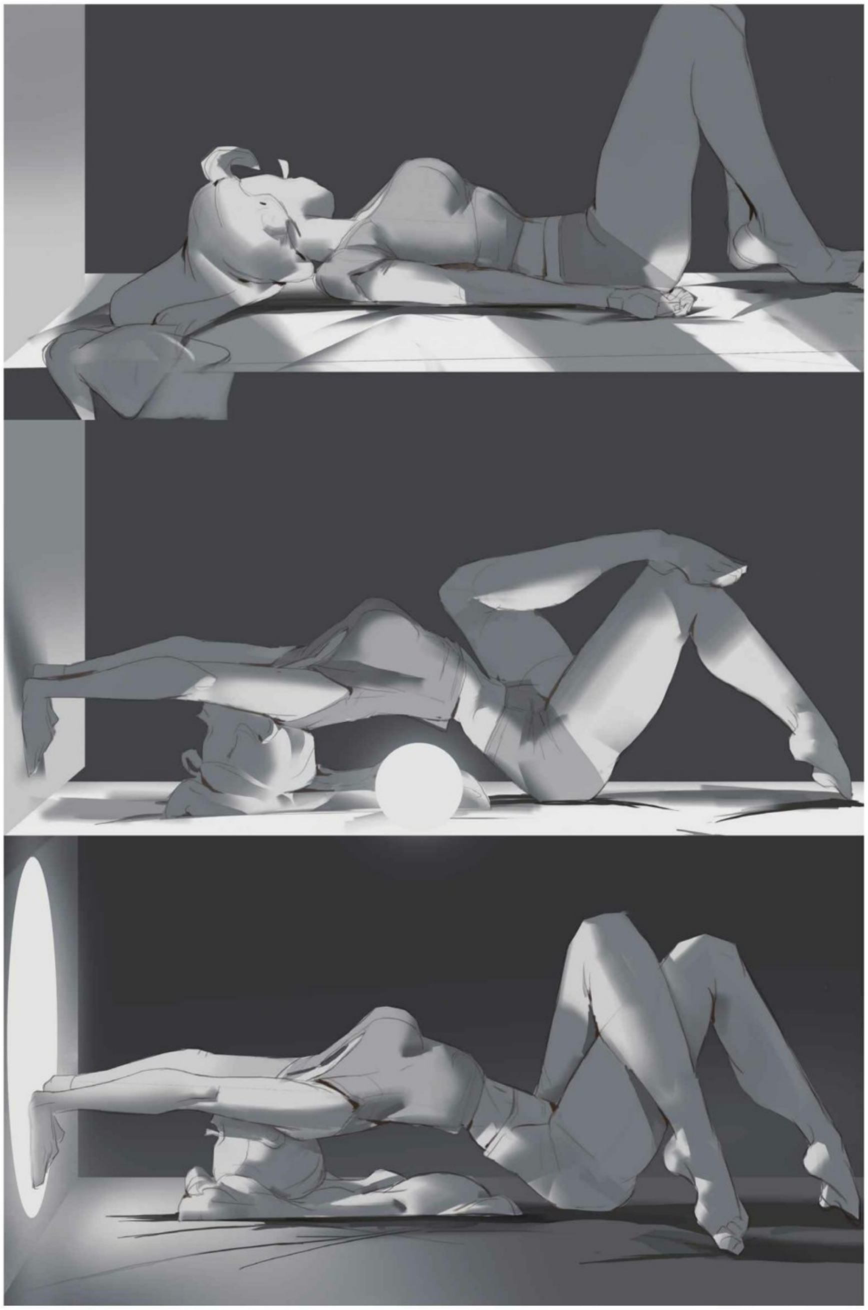


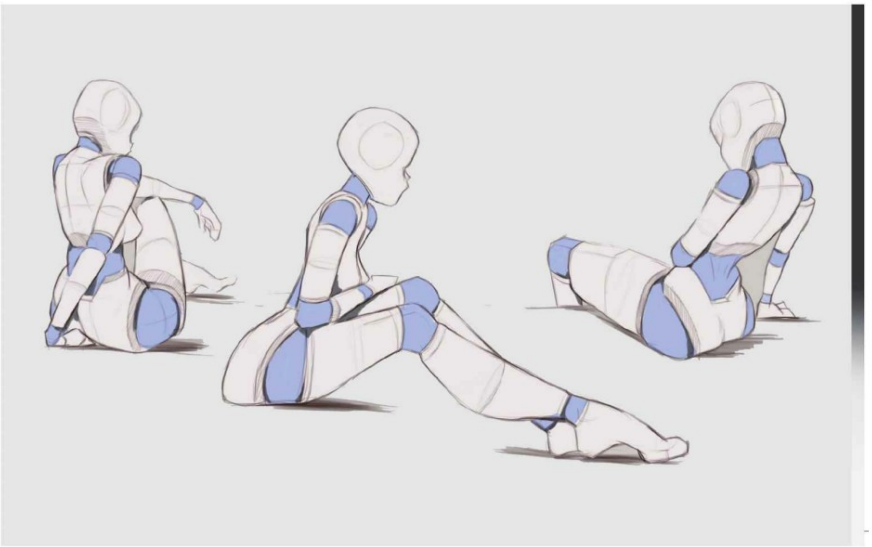
The light and shadow effects of the same joint and human figure under different light source directions are as follows:

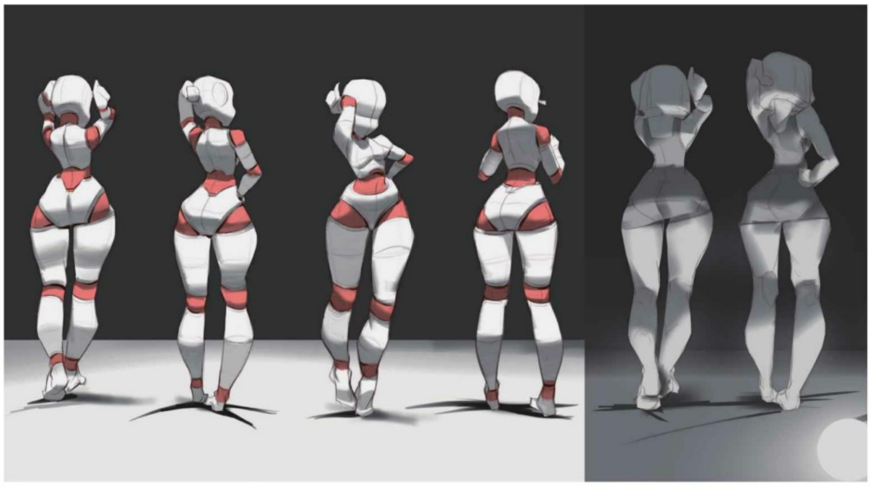
Down.

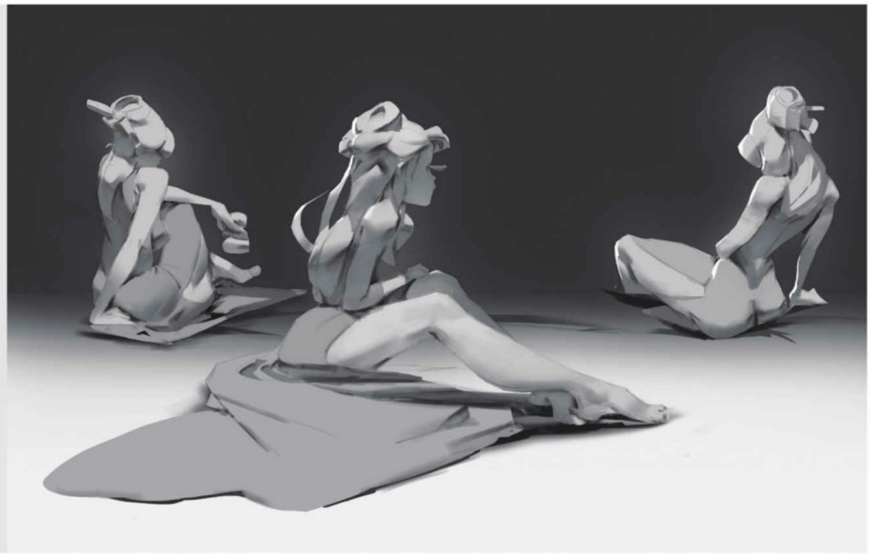


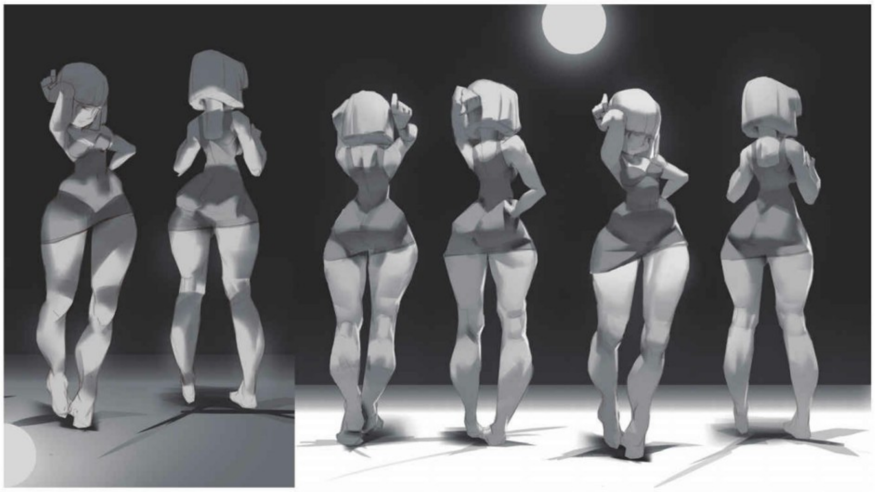


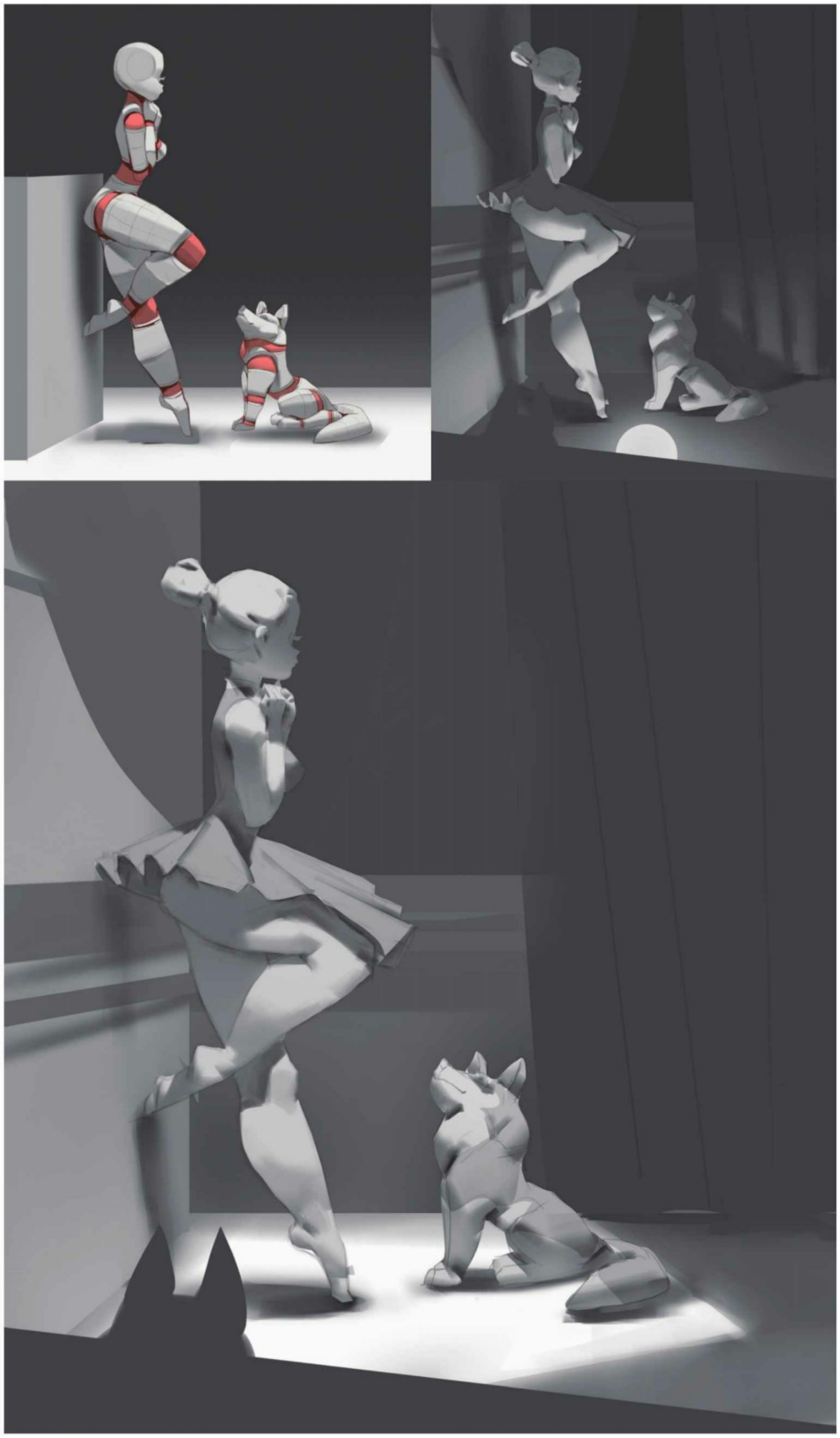


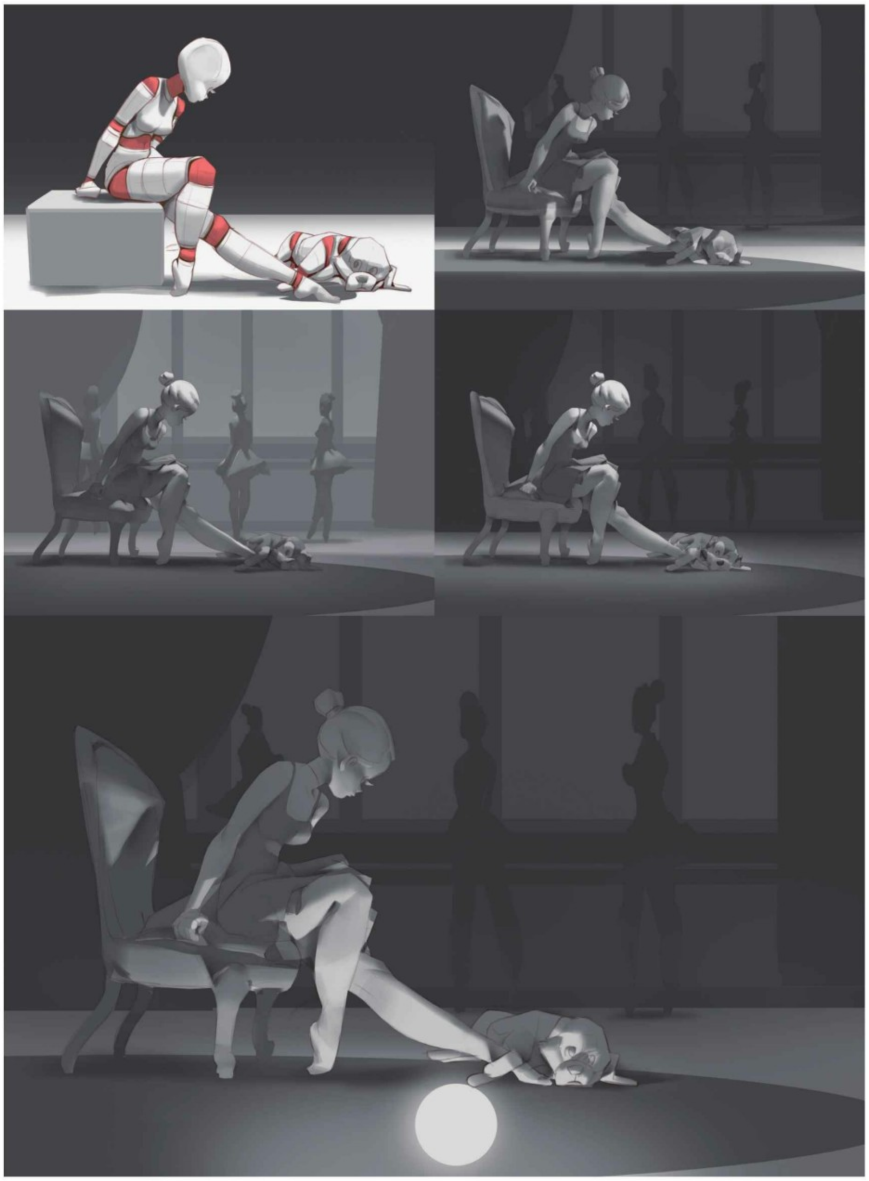


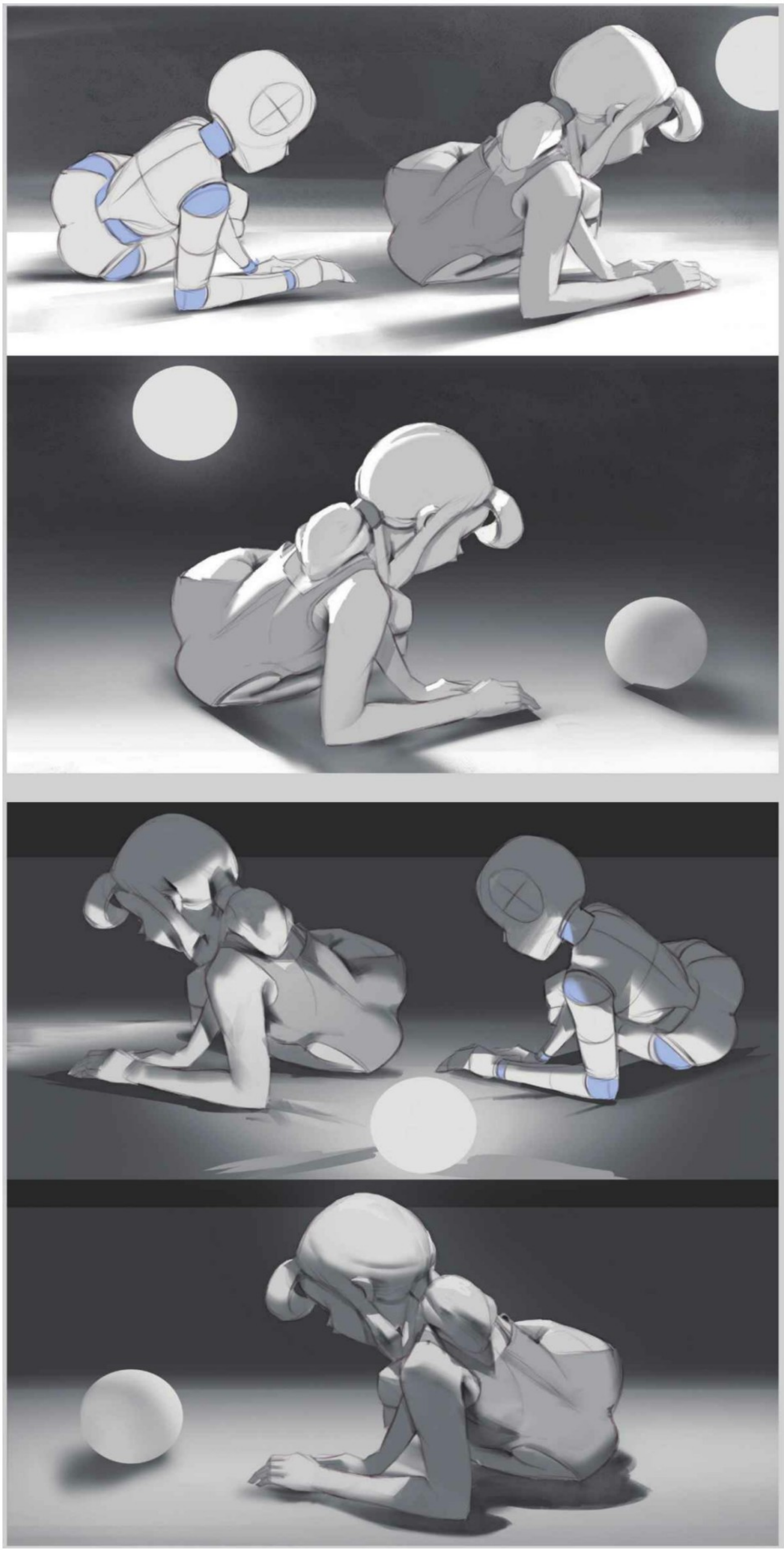












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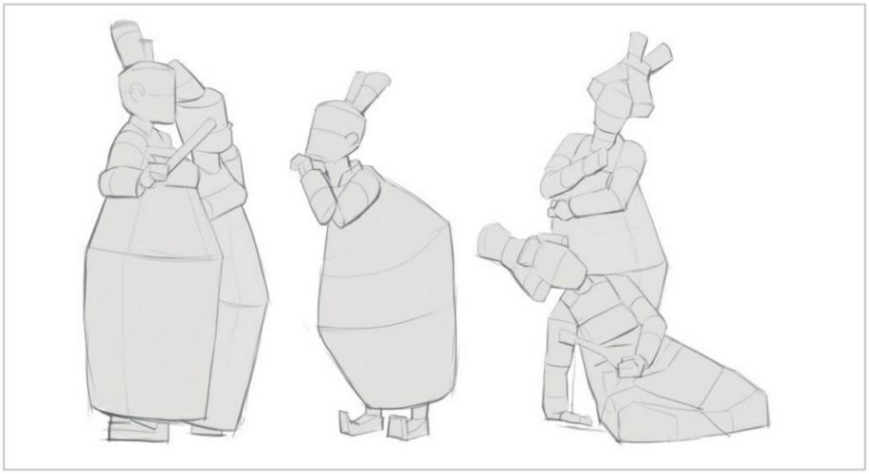
8.3 Examples and Analysis of Light and Shadow

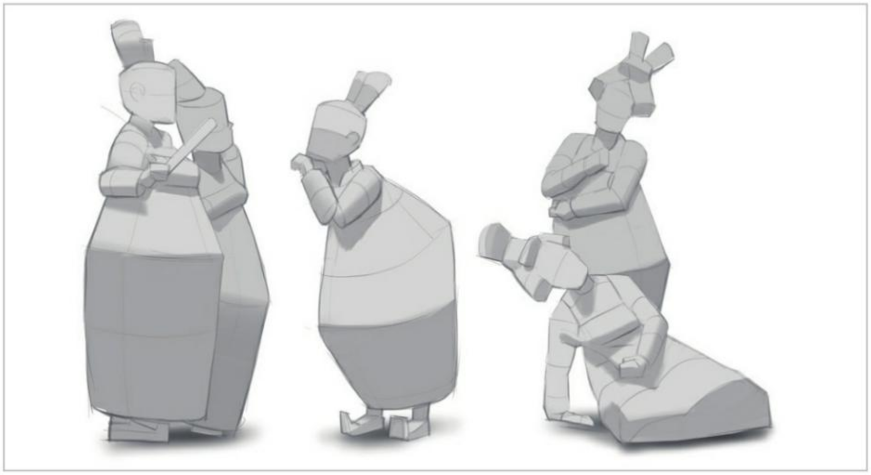
In actual painting, we should get into the habit of integrating the knowledge we've learned into our painting process, cultivate good painting habits, and create accurate light and shadow representations of the human form. At the same time, depending on the figure being painted, the style, and other factors, subtle adjustments to the painting steps are necessary during the actual painting process. Below, we demonstrate the process of light and shadow modeling through three case studies for your reference and learning.

8.3.1 Light and Shadow Design for the Tang Palace Night Banquet

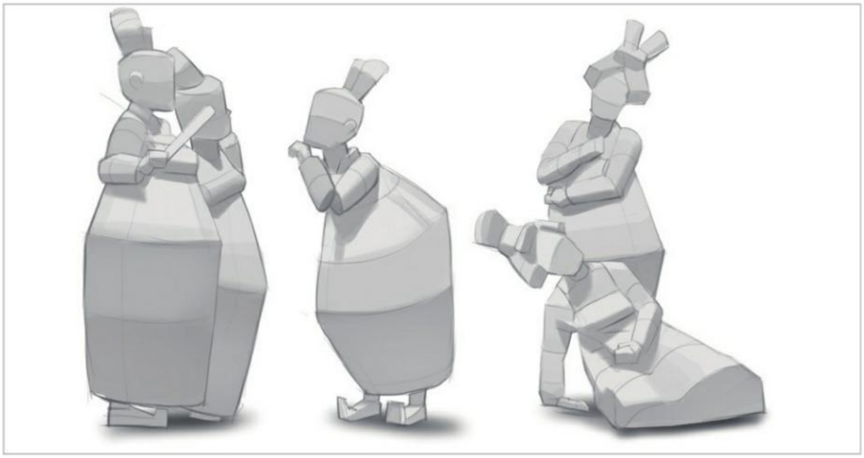
01 Draw line art, ensuring that each character is aesthetically pleasing and summarizing the block structure.



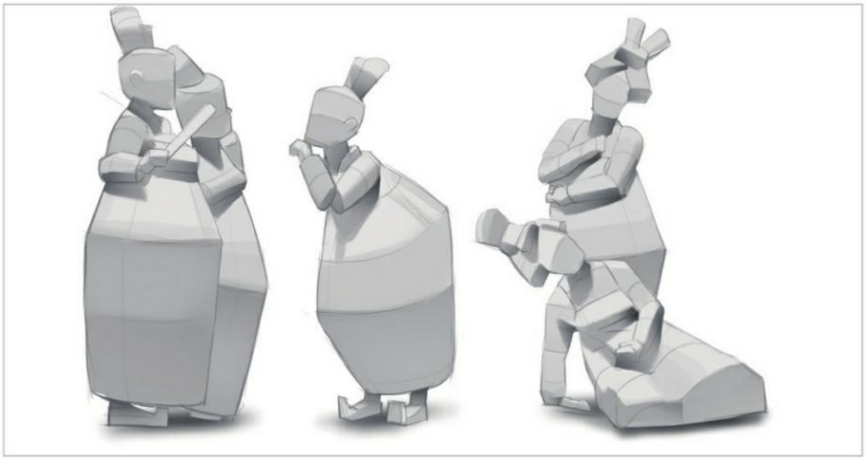
02 Analyze and determine the light and dark areas to ensure that the shape of the dark areas is consistent overall.



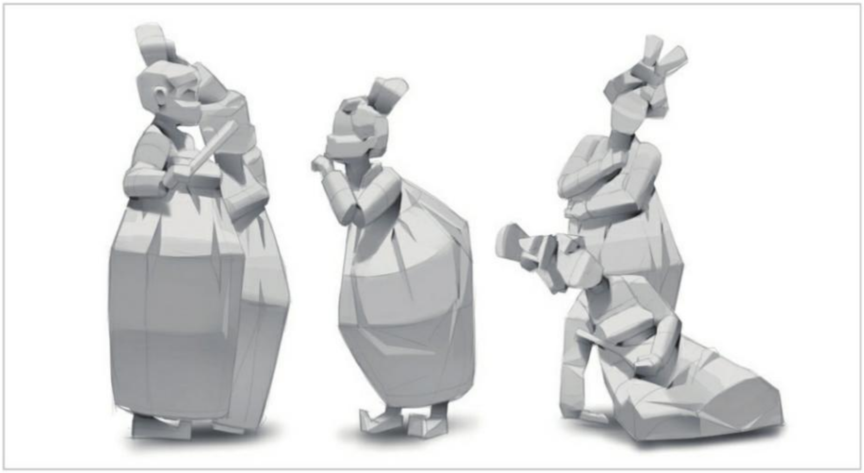
03. Based on the block structure summarized in step 01, distinguish the gray surface in the dark area.



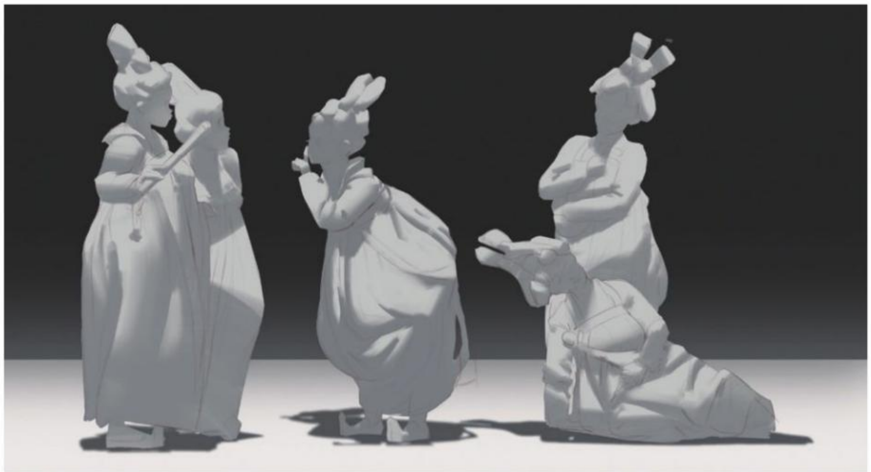
04 Draw the closed areas of the dark part.



05. Add finer structures to the human body to enrich the details of the image.

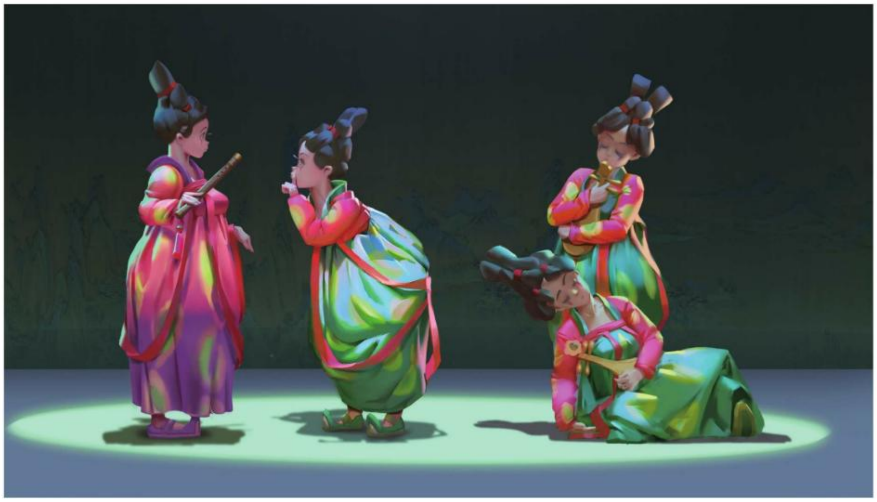


06. Add a background to the image and refine the transitions to ensure that the dark areas of the image are consistent and complete.



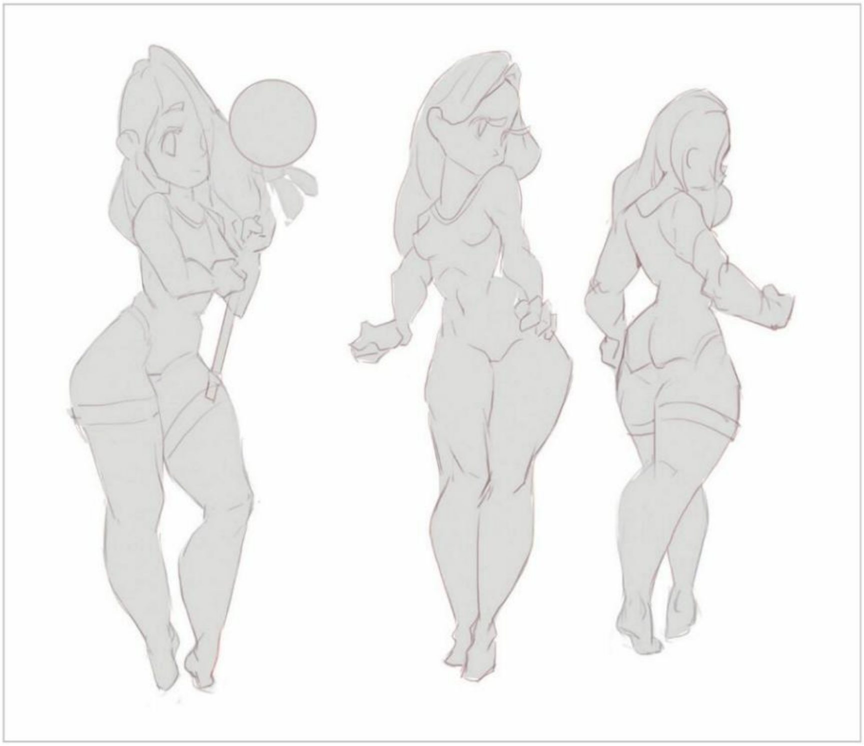
07. Further refine the details.

08. Layer colors and refine the image.

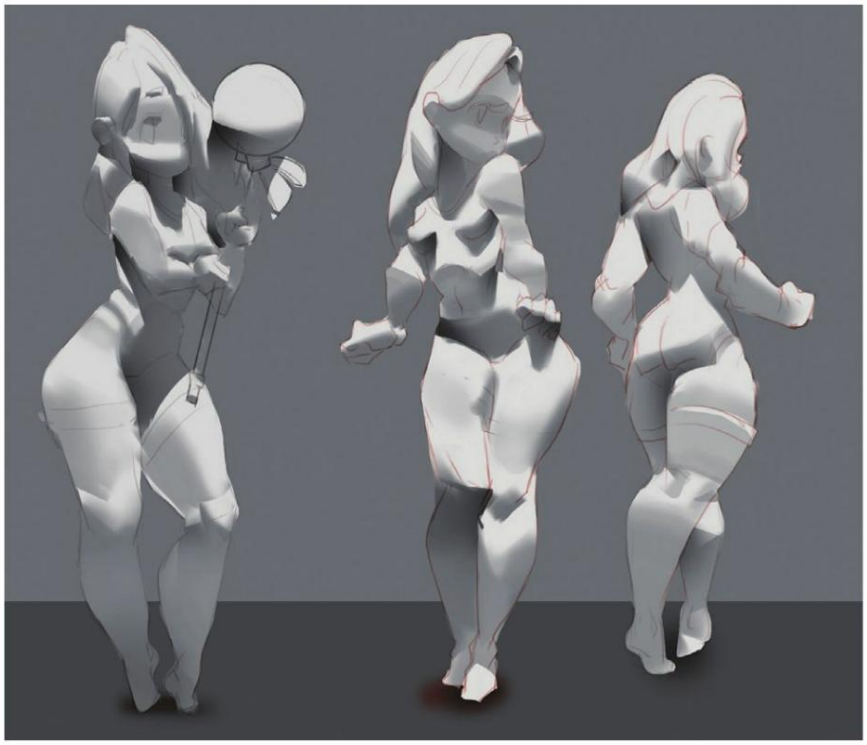


8.3.2 Pink Girlish Light and Shadow Design

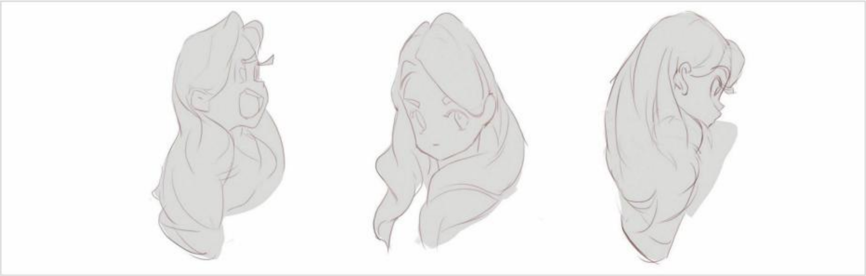
01. Draw the line drawing of the character to determine the basic shape of the character.



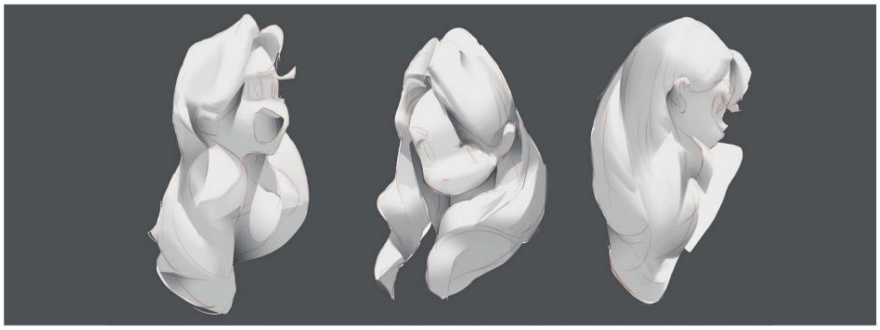
02. Draw the light and shadow based on the character's line drawing.



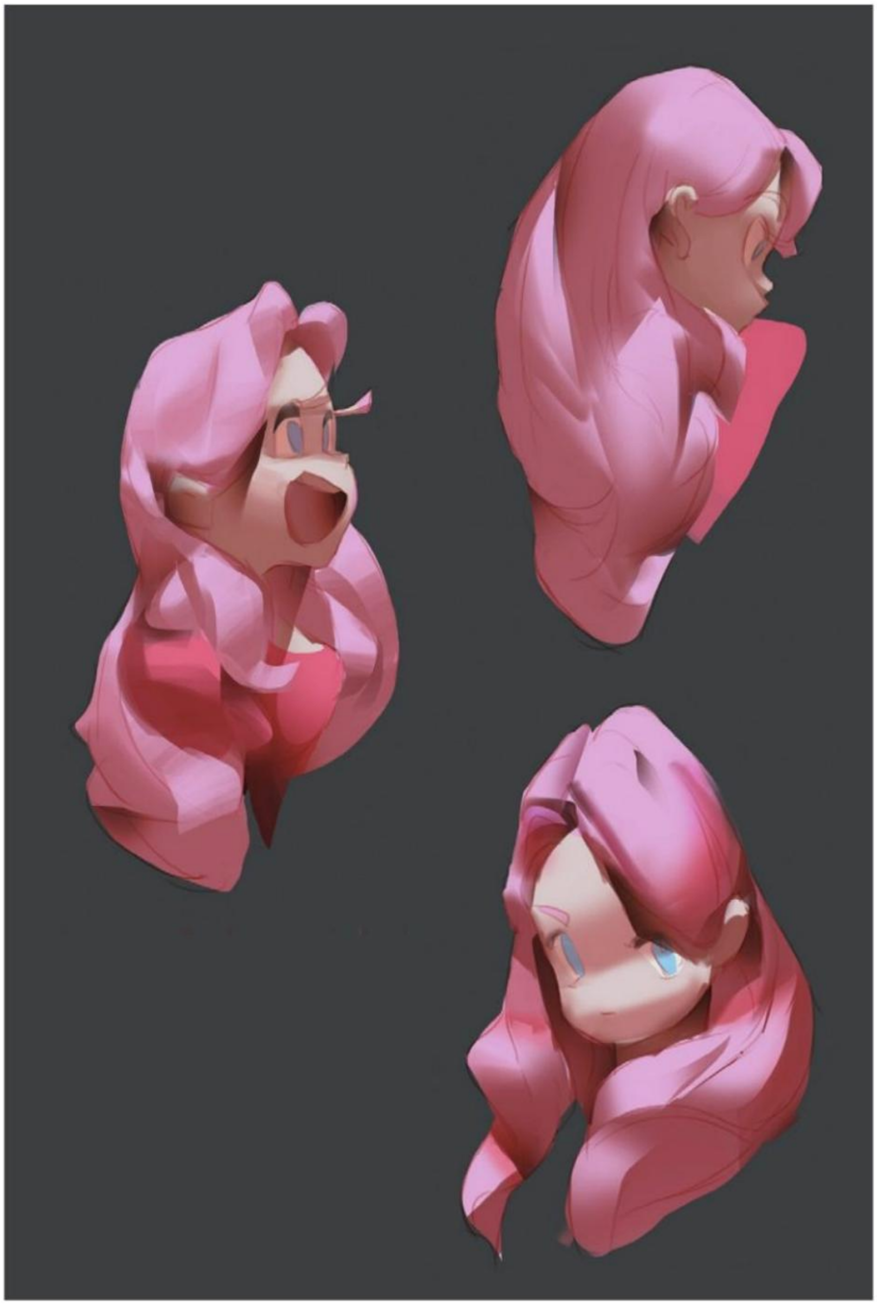
03 Draw the line art of the character's facial expressions.



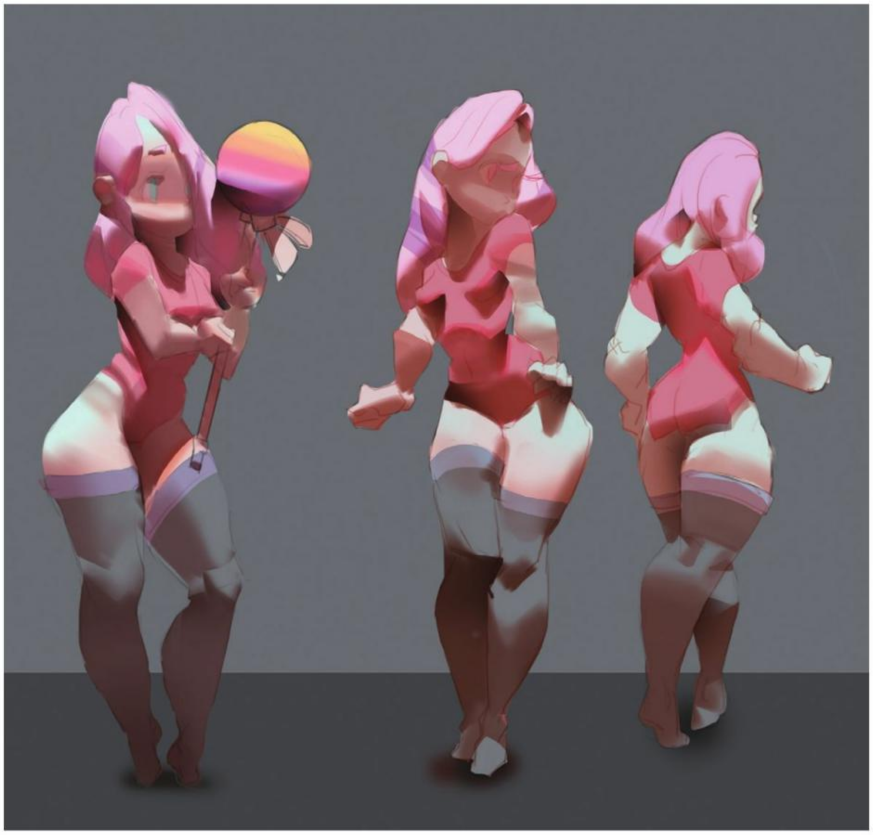
04. Add lighting and shadows to the characters.



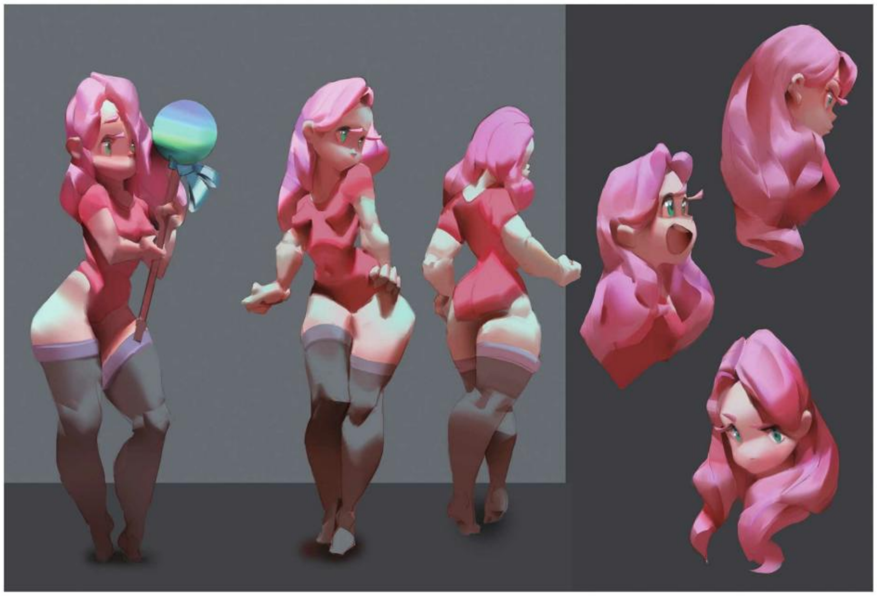
05 is used to overlay colors on character expressions.



06 is for overlaying colors on the character's animation.

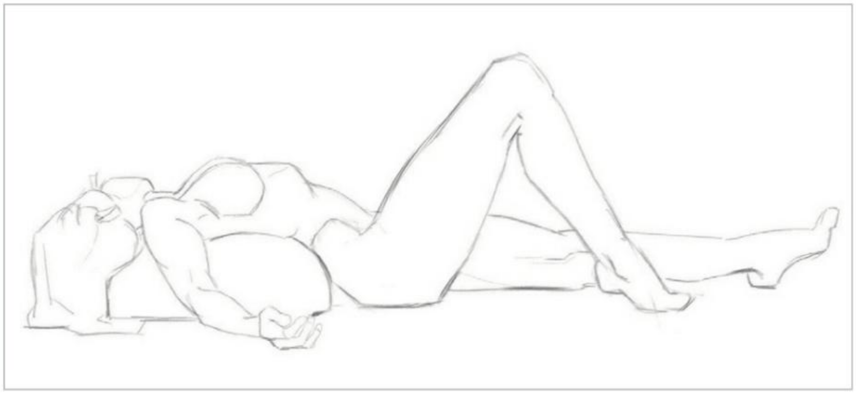


07 Overall adjustments and detailed drawing production.

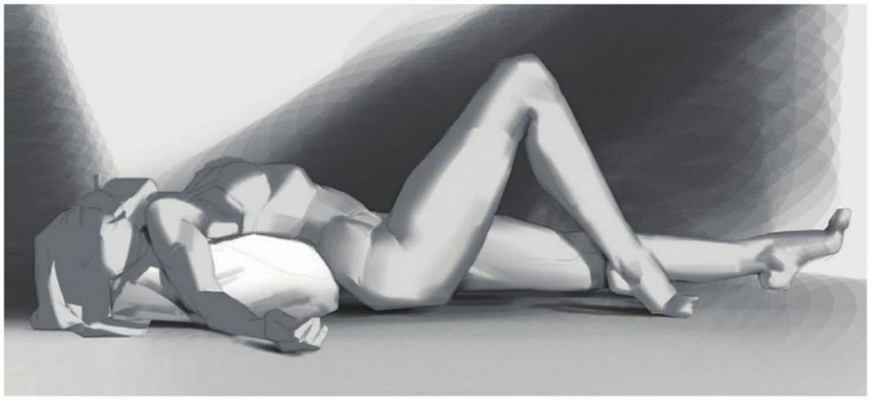


8.3.3 Light and Shadow Shaping of a Female Figure Facing Up

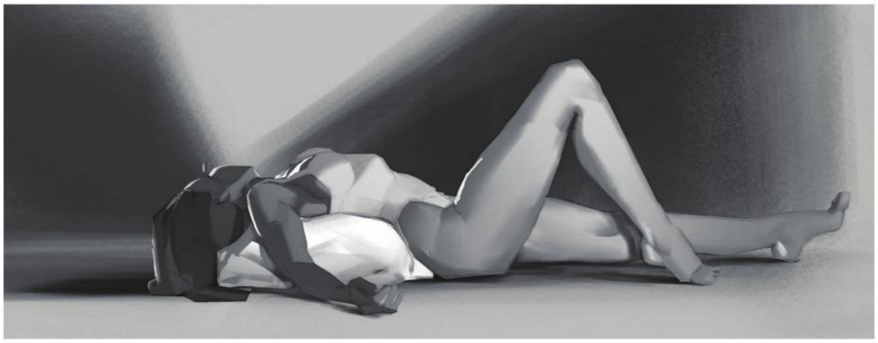
01. Draw the line art to determine the basic shape of the character.



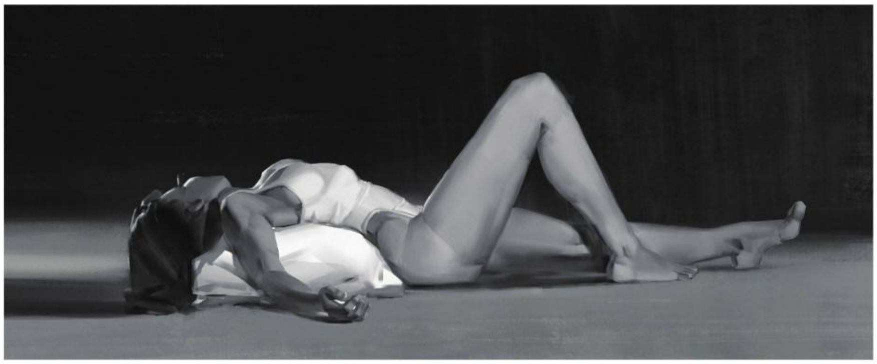
02. Based on the direction of the light source, roughly summarize the light and shadow relationship of the human body (at this stage, the light and shadow summary only needs to show two color levels, and should not be too complicated, otherwise it will affect our overall control of the image, making it difficult to properly process the image in the later stage).



03 Continue to delve deeper into the details, distinguishing the tones of different materials in the human body (such as hair, clothing, etc.).

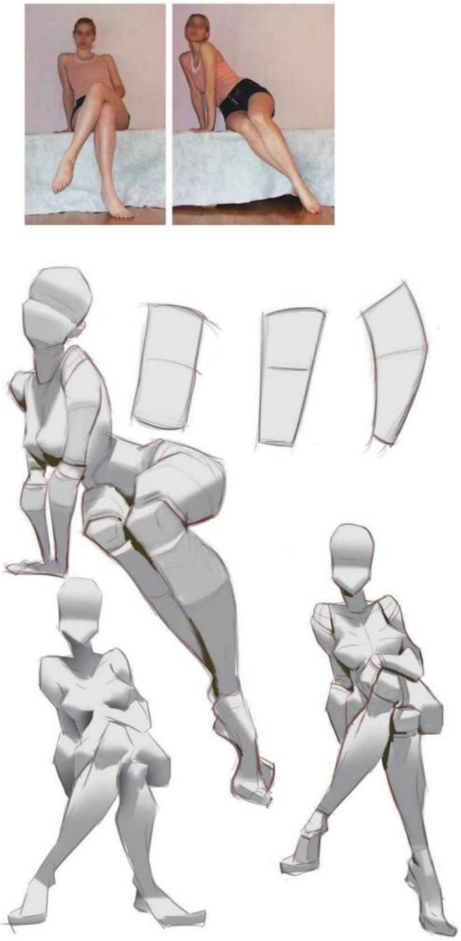


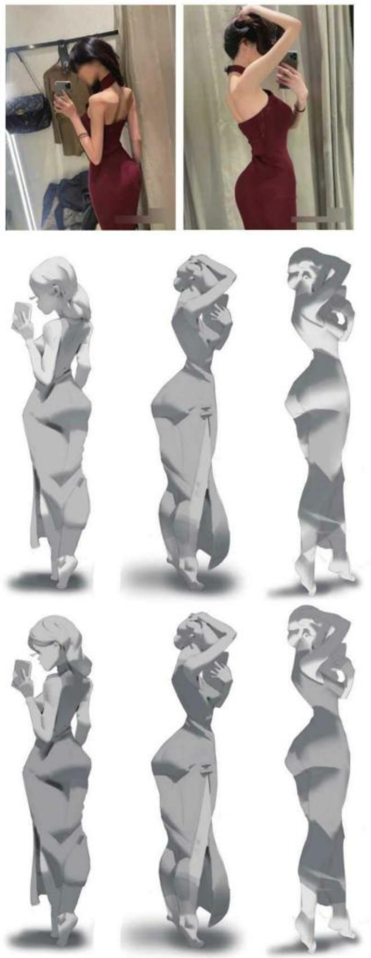
04. Refine the image to reveal more subtle structures. Unify and adjust the image to complete the shaping.

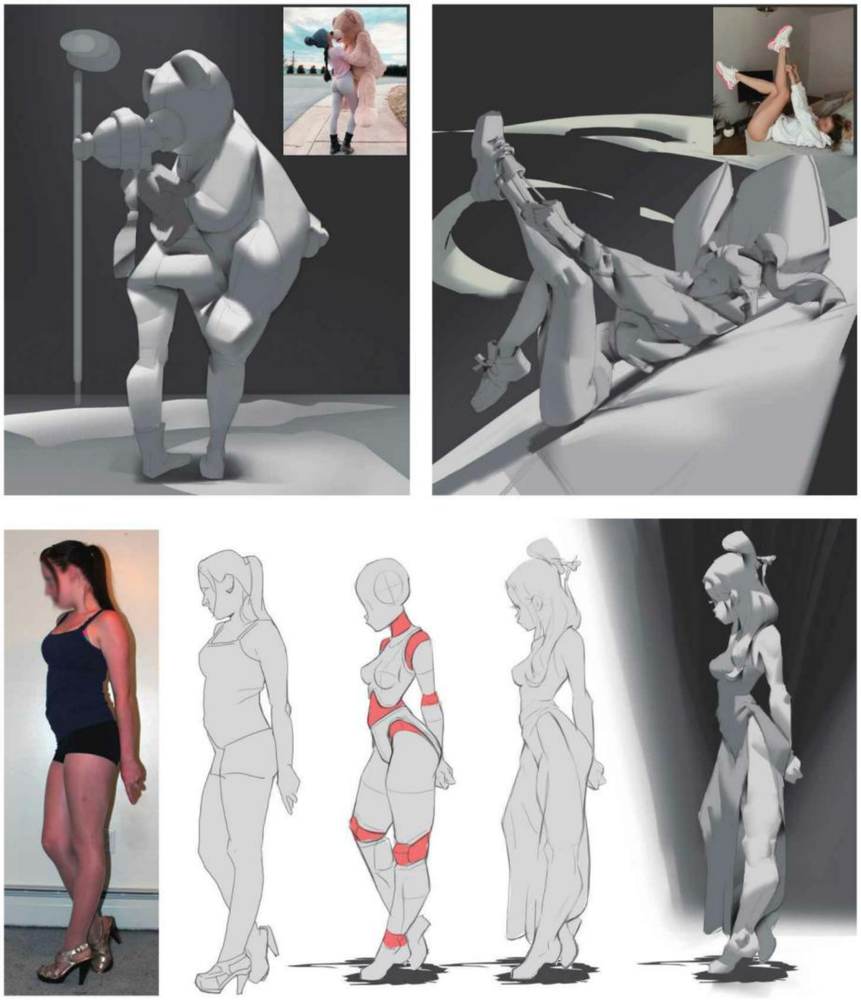


More specialized training

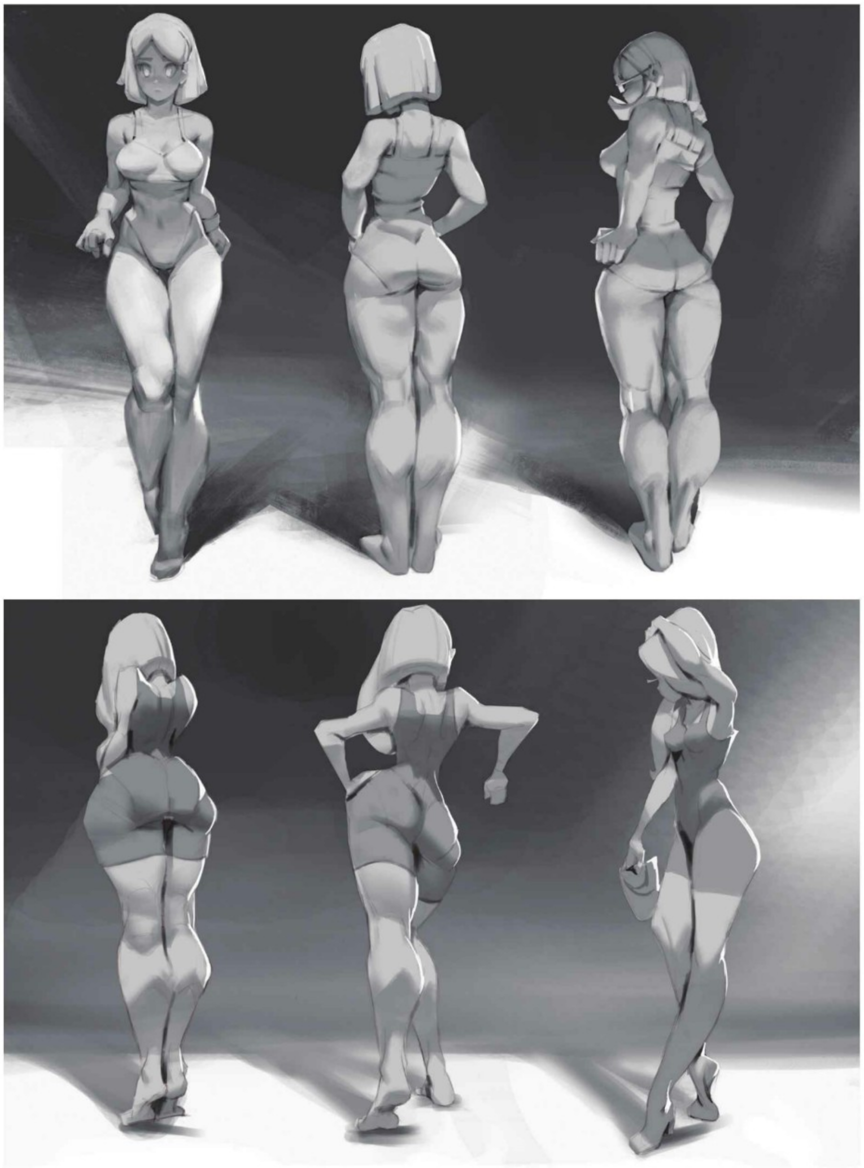
Create a set of exercises based on photographs to sculpt the human body using light and shadow.

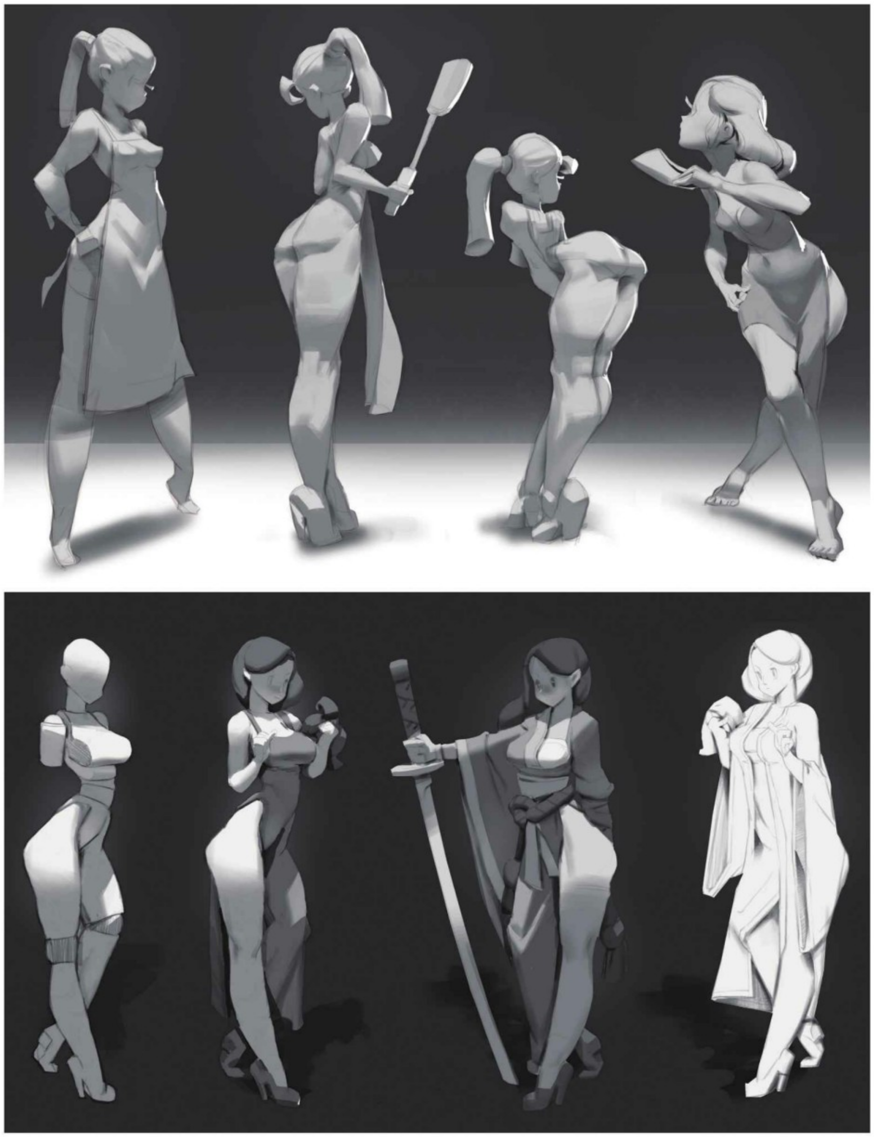


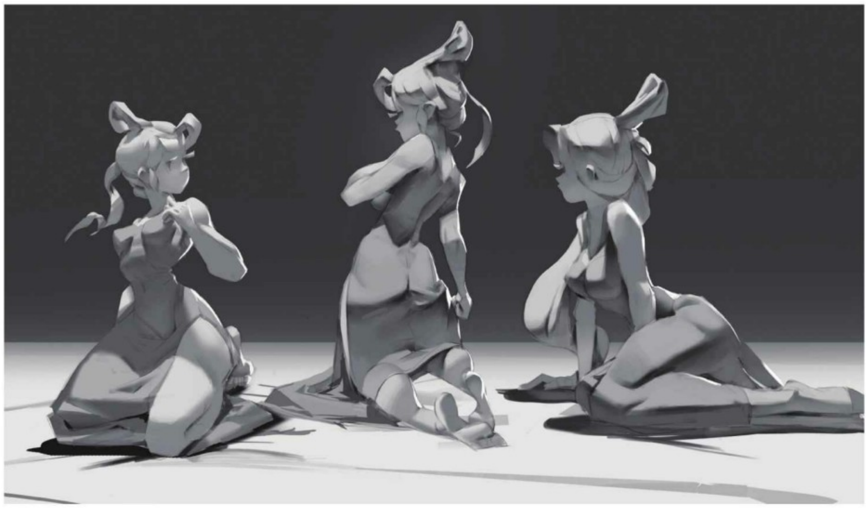


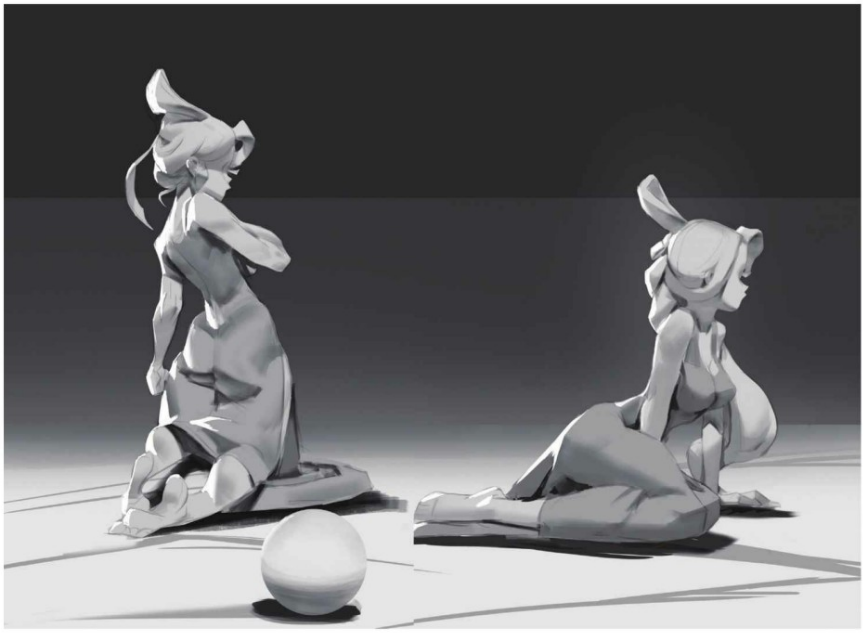


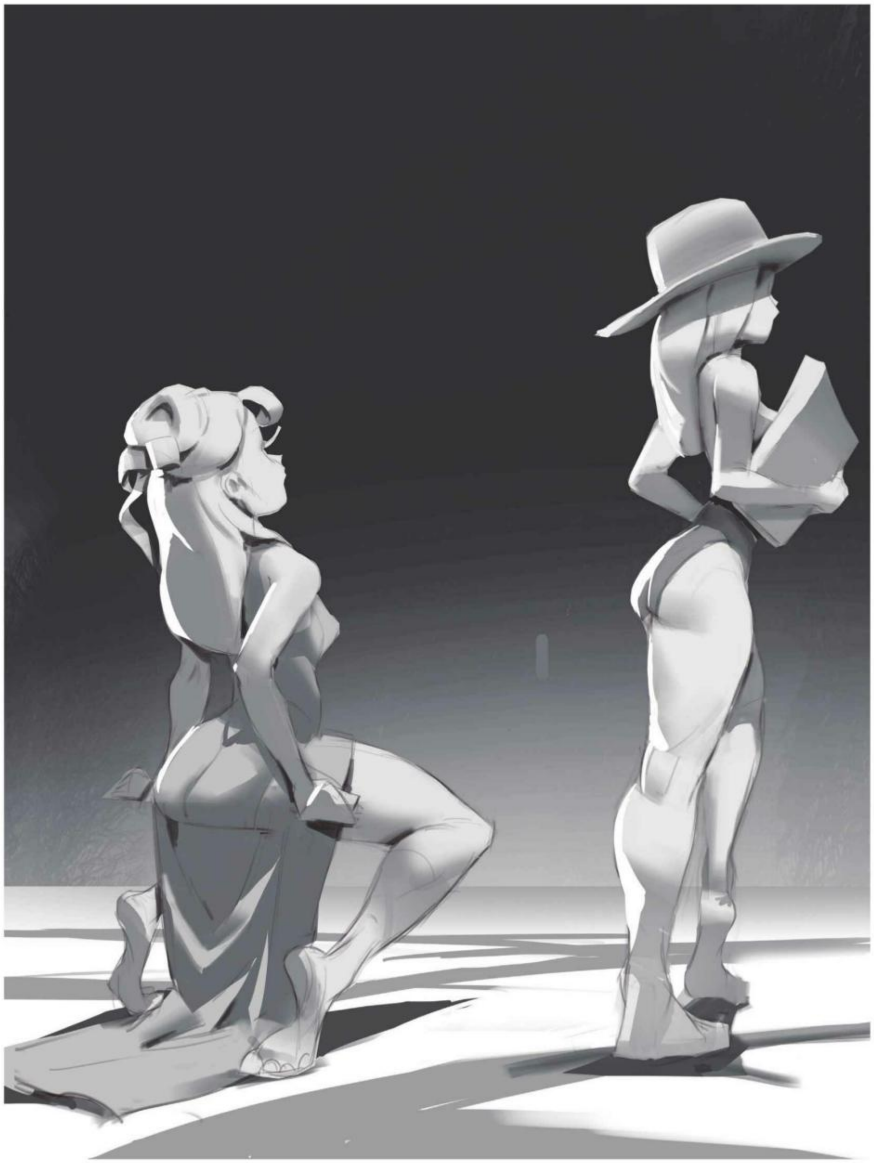
Practice shaping the human body with light and shadow under top lighting conditions.











Practice a series of exercises involving the interplay of light and shadow on the human body from multiple angles.

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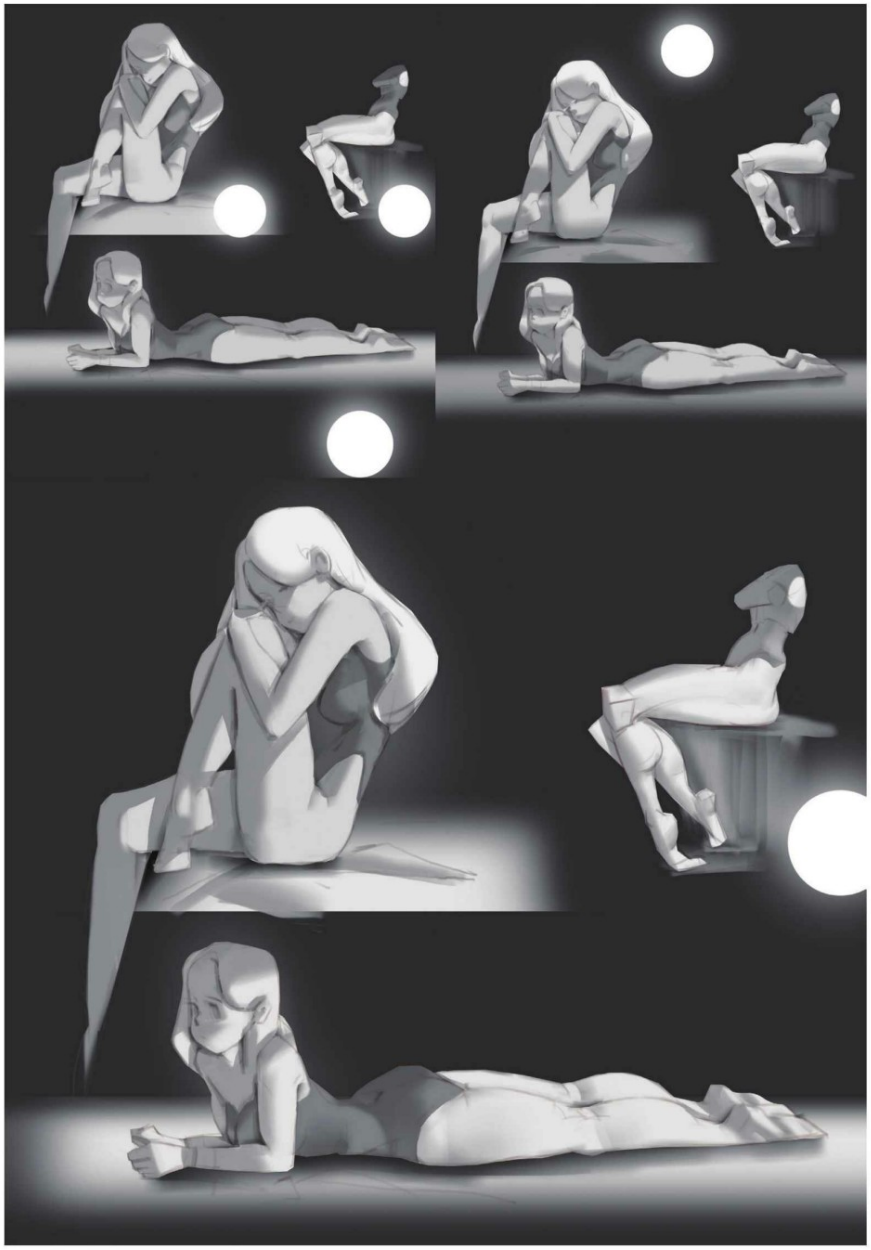
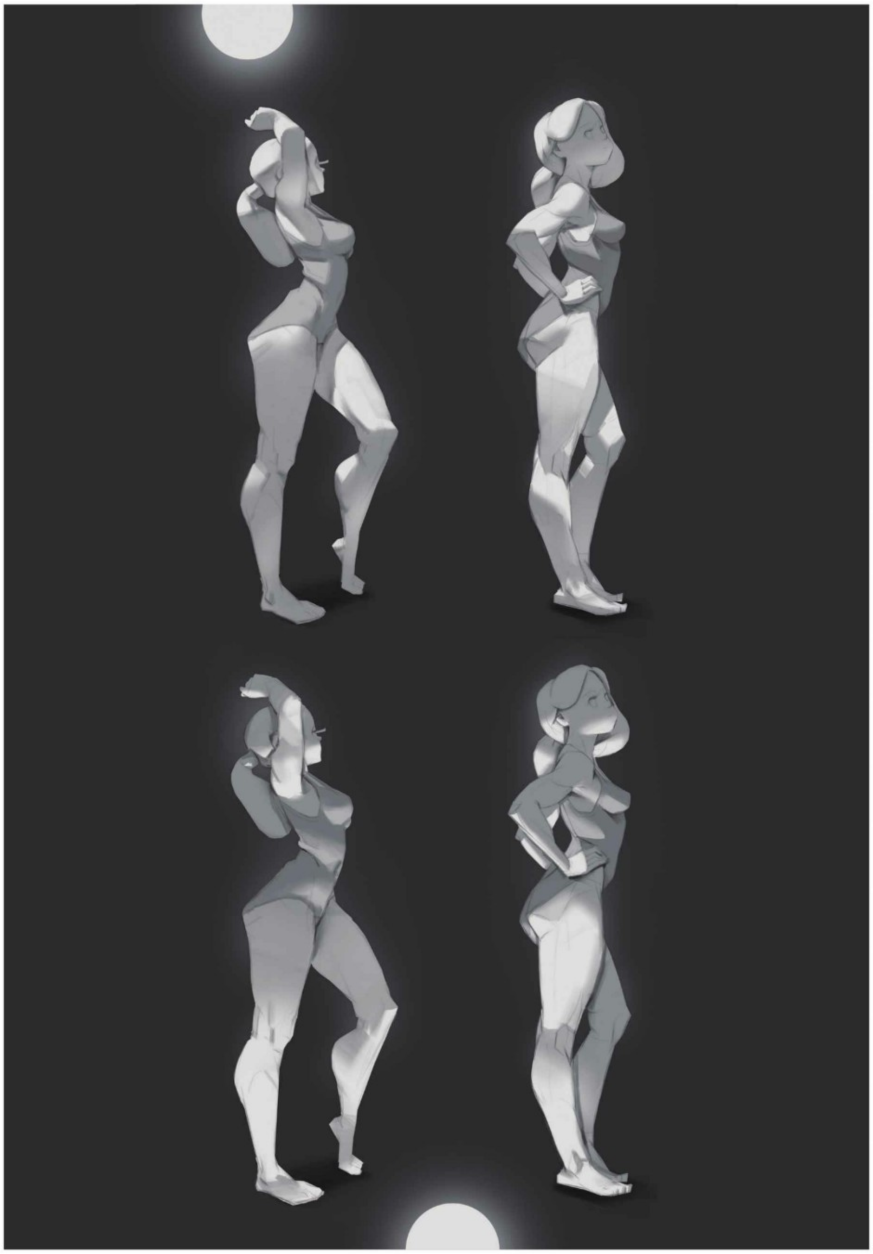
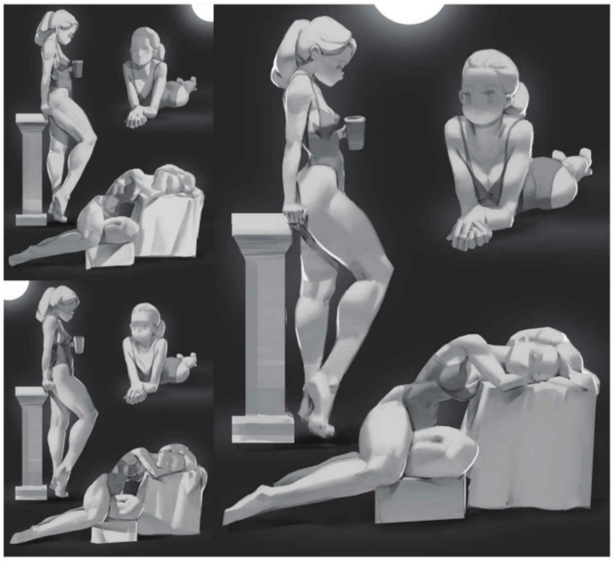
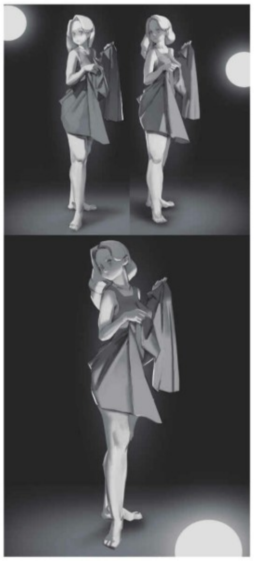
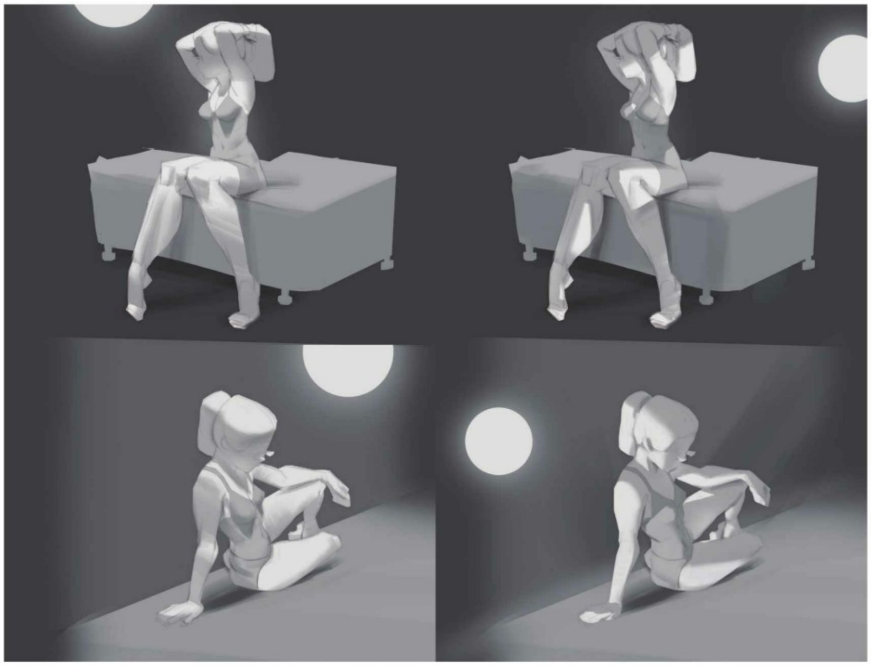
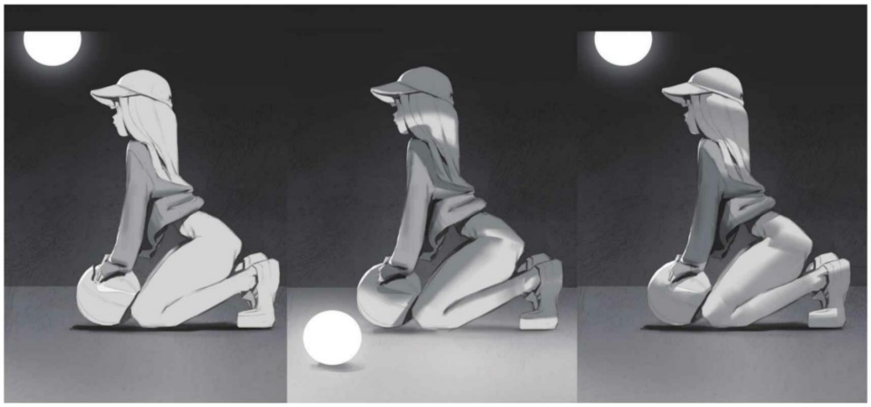


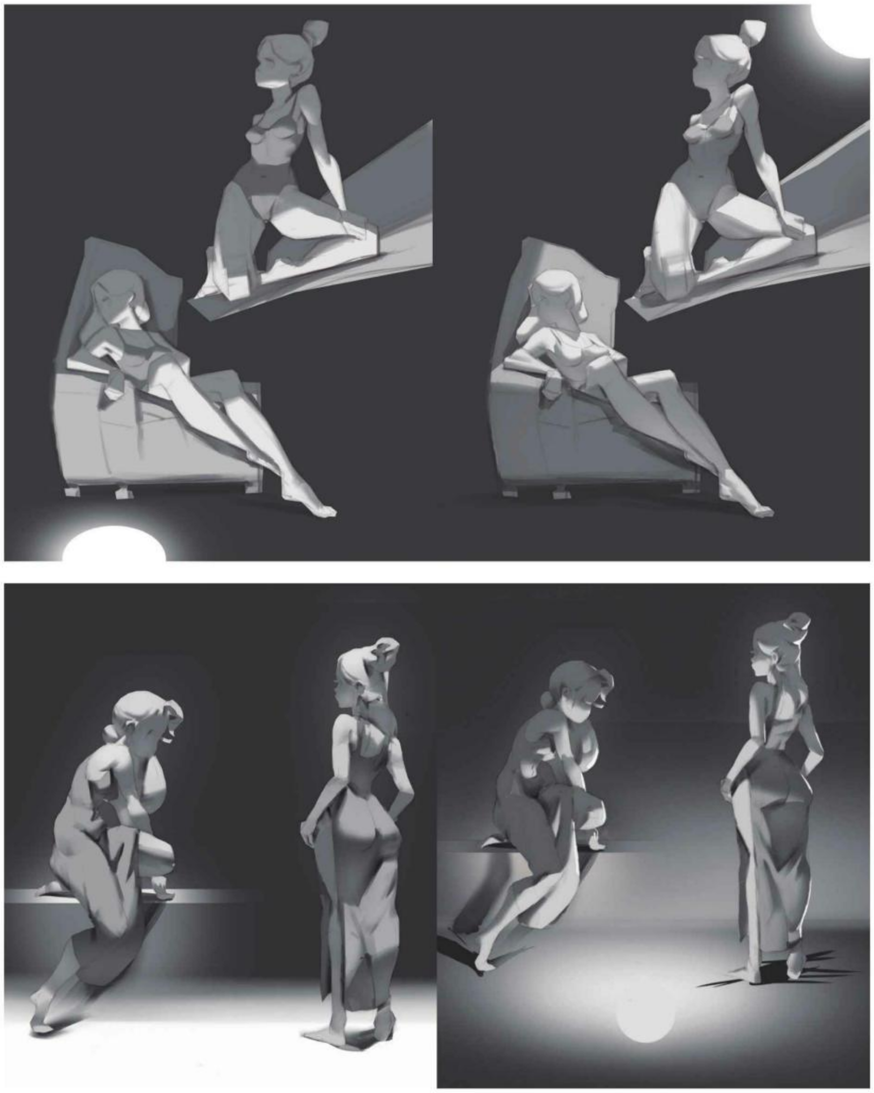




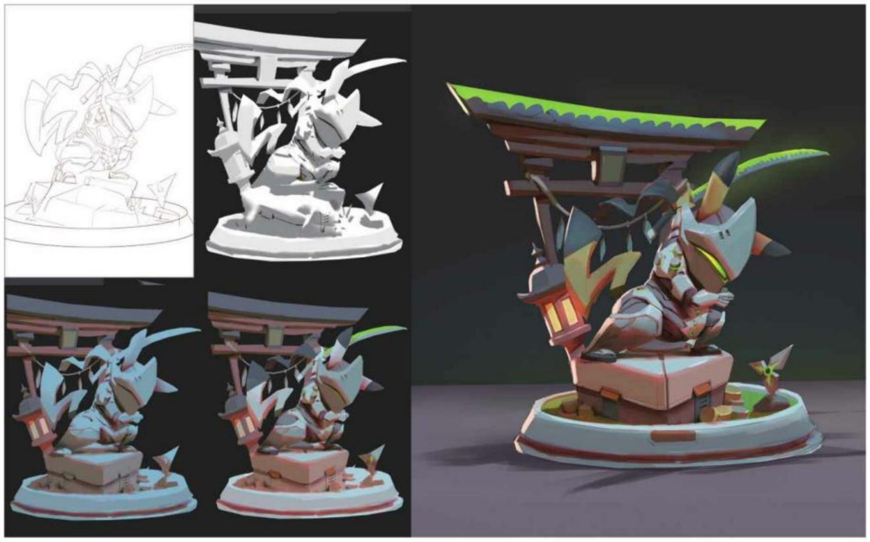


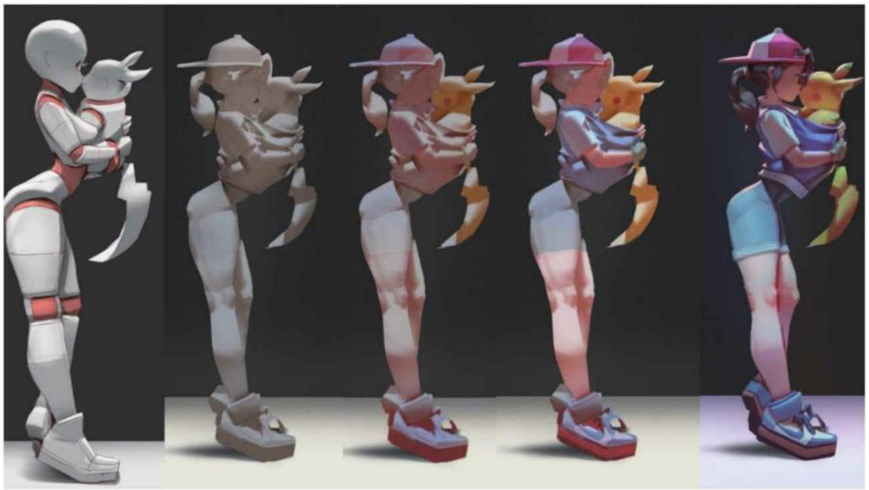




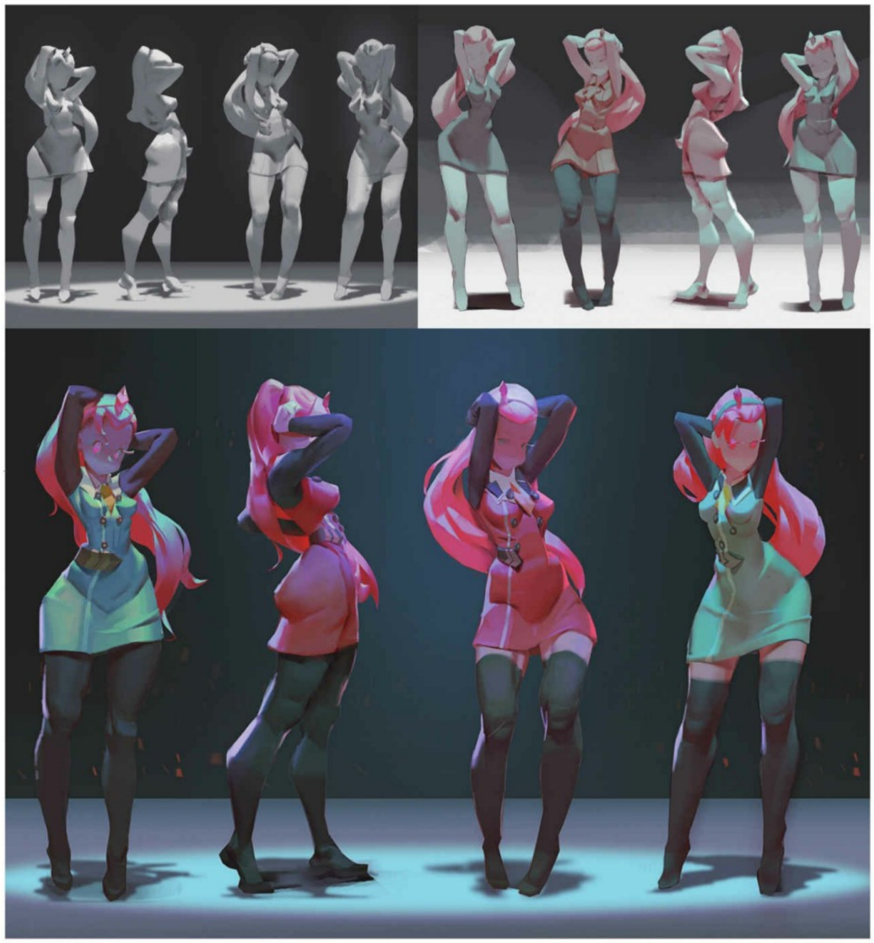


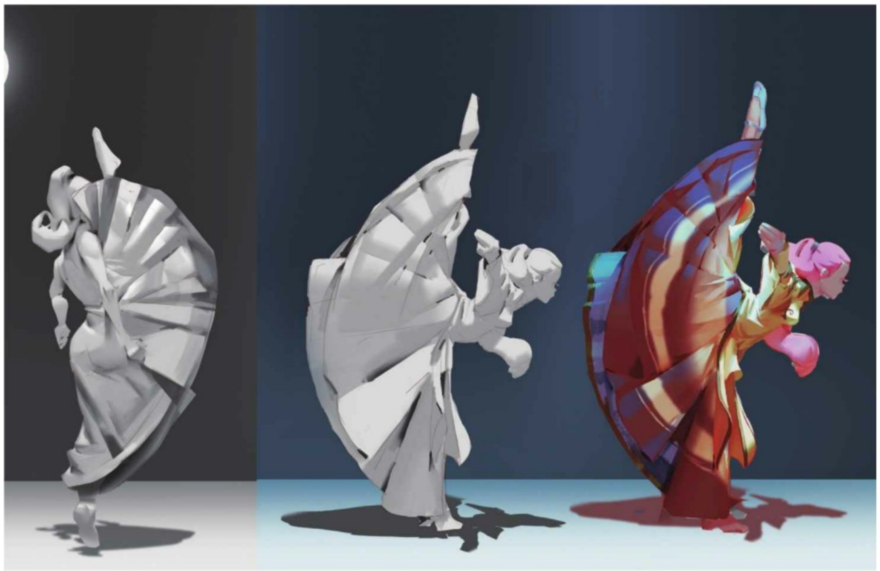
Practice creating a series of light and shadow effects for anime characters.

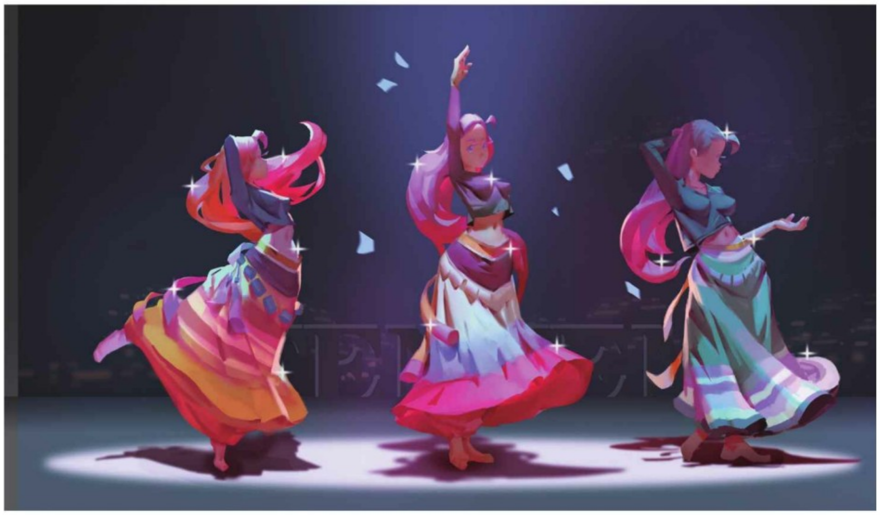




Practice a set of dance moves using light and shadow on the human body.







Chapter 9 Specialized Training on Clothing Folds

exist In painting, the human body is mostly depicted under clothing. Therefore, in creating... To better unleash one's creativity and imagination during the process, in addition to mastering human anatomy, one also needs a clear understanding and awareness of clothing folds. Accurately depicting the changes in clothing folds can create a more realistic visual effect.

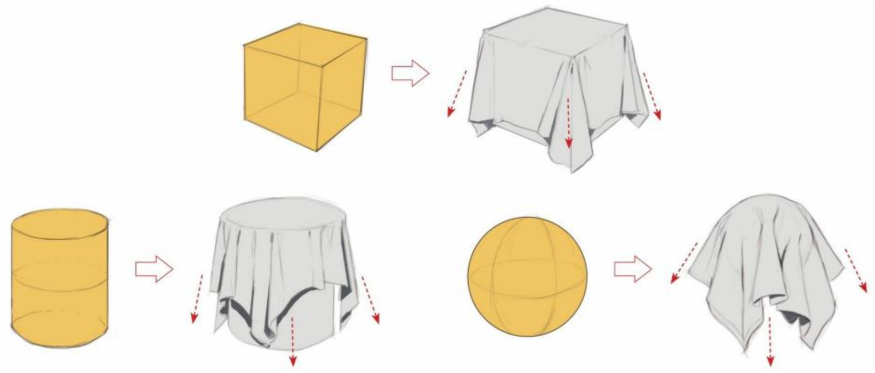
9.1 The Formation of Clothing Folds

Clothing wrinkles are caused by a combination of factors, including human movement, body structure, and the effects of wind and gravity.

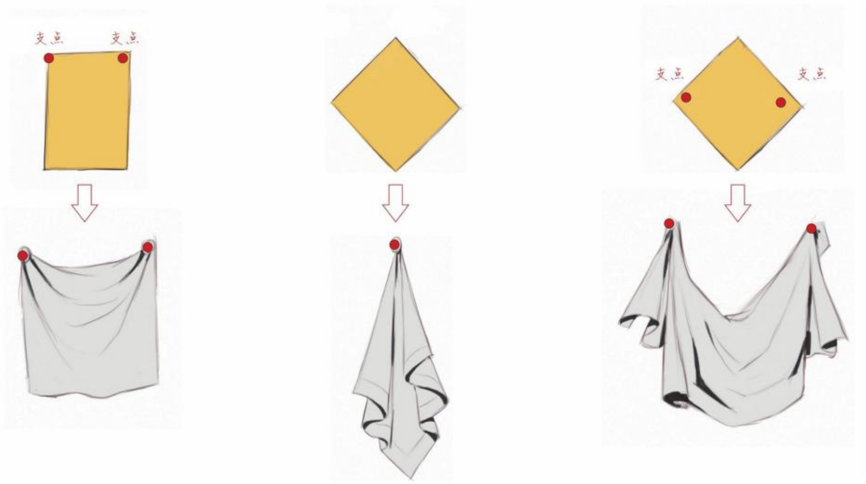
It was formed due to the influence of [the government/organization].

9.1.1 Gravity Factor

Fabric itself has no specific shape, but it will form different folds under the influence of gravity. Placing fabric on a cube, cylinder, or sphere will produce folds of specific shapes, as illustrated below.

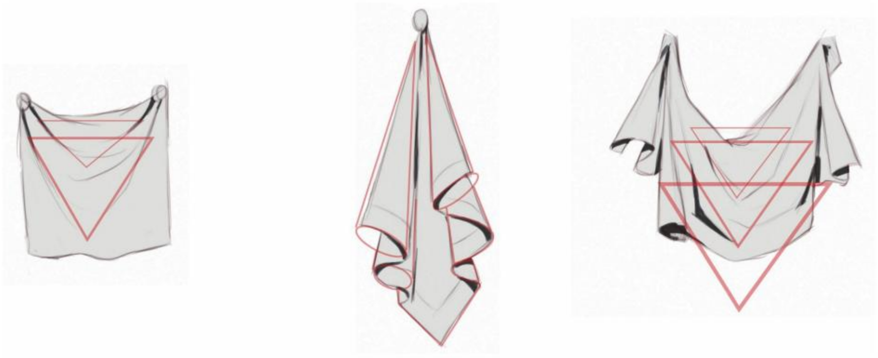


The effect of fixing the fabric to the wall with one or more nails is illustrated below.

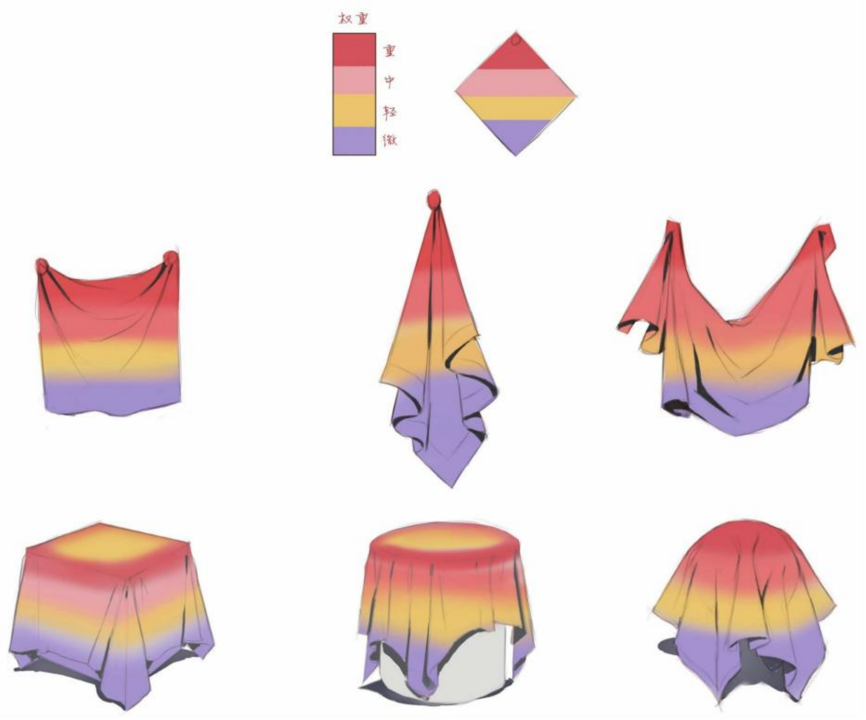


Upon closer inspection, we can see that the number of fixing nails and the distance between them are different. The fabric also changes shape differently; the folds of the fabric further away from the nail are more relaxed.

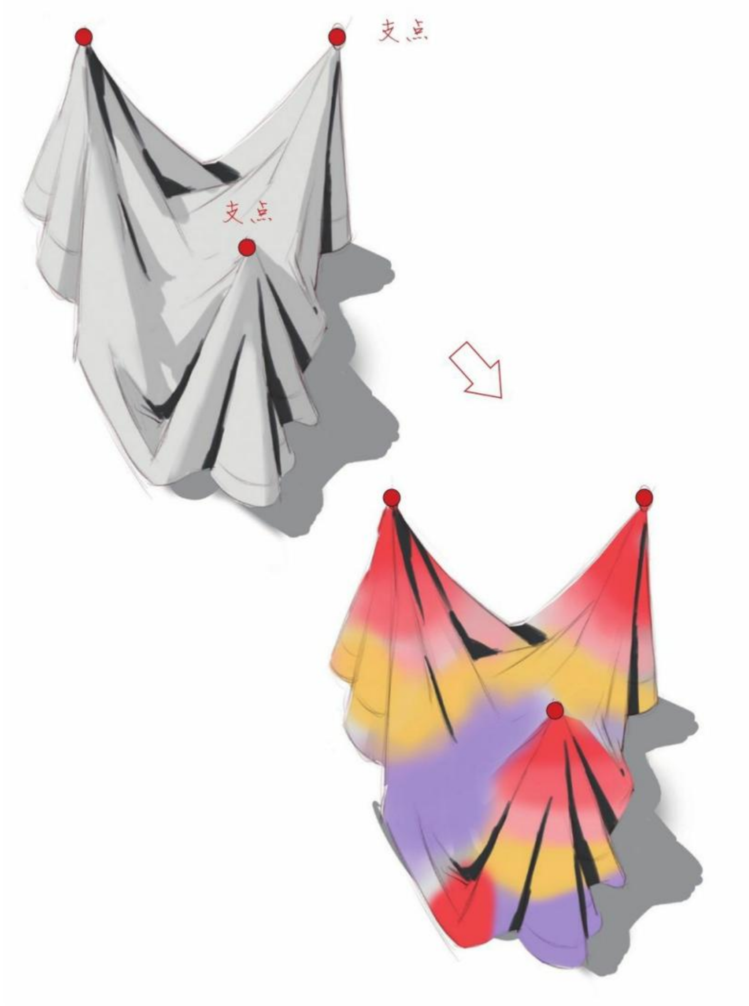
Furthermore, some 3D software algorithms employ the concept of weights. The closer to the pin point, the greater the influence on the soft object's shape, resulting in more pronounced shape undulations. Conversely, the farther away from the pin point, the less the soft object's shape is affected, eventually disappearing altogether.



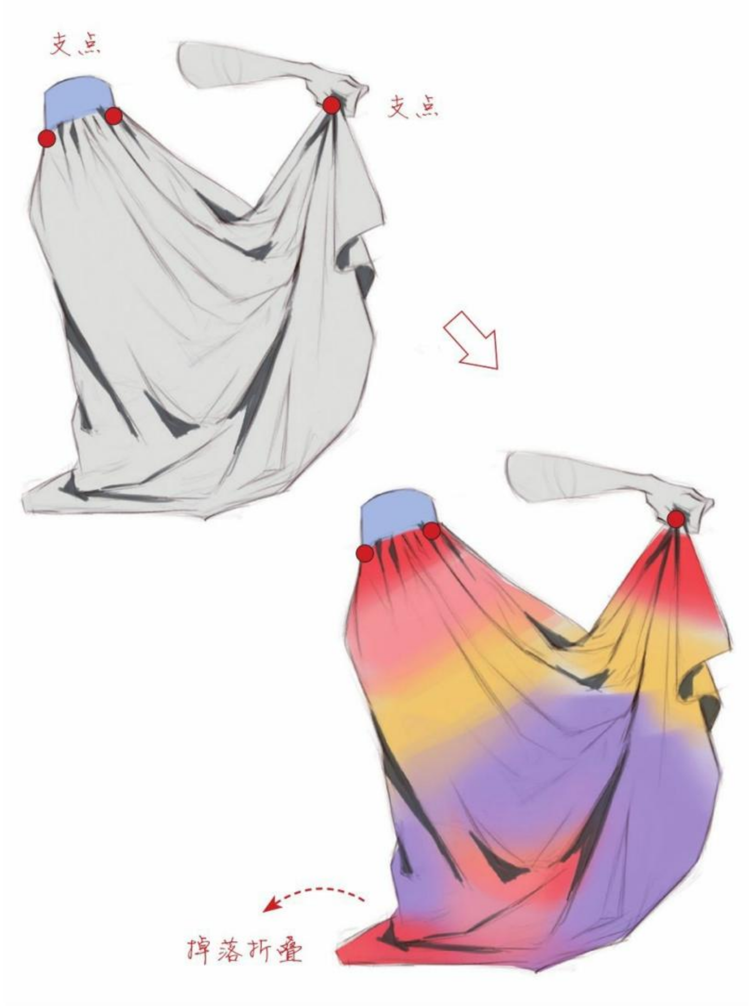
The image below shows how the fabric color changes depending on the weight of the pin points.



The diagram below illustrates the shape changes of fabric under the action of multiple fulcrums.

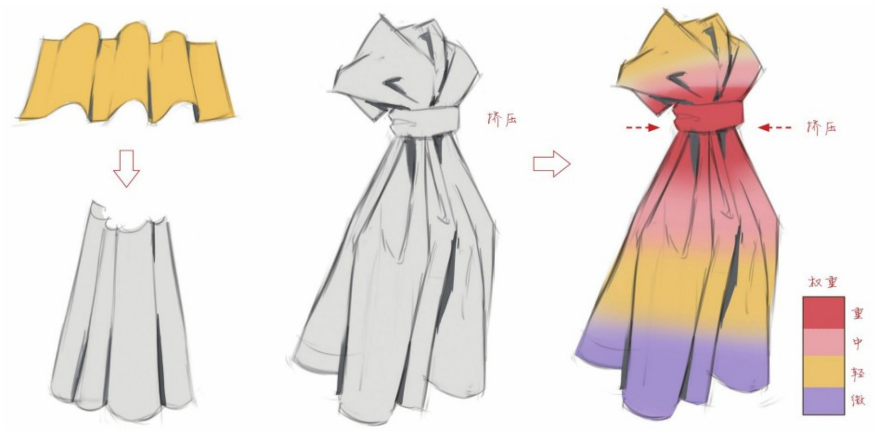


When you pull the skirt, it will create pleats supported by three points.



9.1.2 External Extrusion

When there is no external pressure, the shape of clothing fabric is generally very regular. When fabric is subjected to pressure, it will develop wrinkles of different shapes.


挤压
挤压
权重
重
中
轻
微

9.2 Common Forms of Clothing Folds

The previous section explained how changes in support points and pressure can cause different forms of clothing fabric.

Wrinkles. Next, we will analyze the different types of wrinkles.

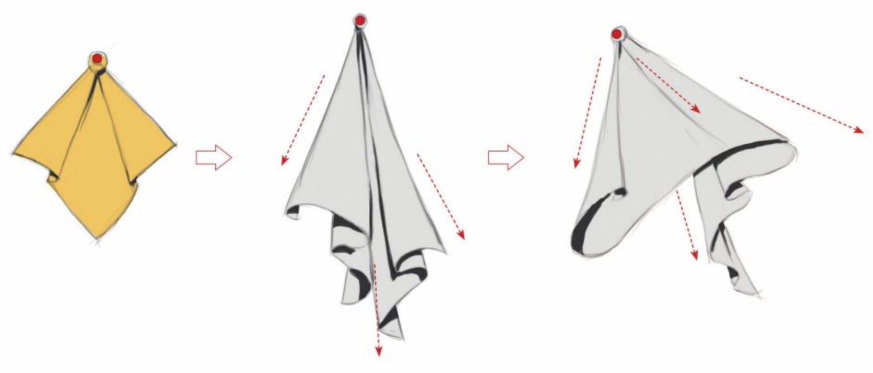
We can break down clothing folds into draped, tubular, spiral, draped, and zigzag types.

It comes in various forms, including snap-on and half-button.

9.2.1 Vertical type

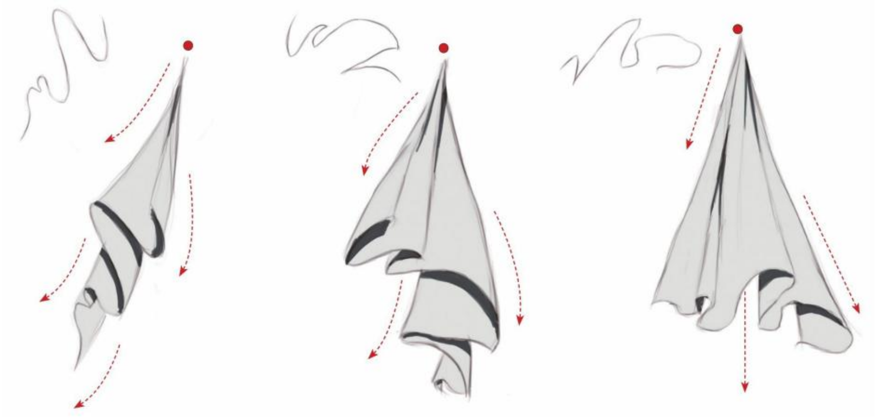
The draping folds in clothing are mainly due to the effect of gravity on the fabric after it leaves its support point, creating a rhythmic effect.

This effect is created by a rhythmic twisting downwards to the edge, and is commonly found at the hem of a stationary long skirt.



We can first draw the basic shape and trend of the folds, and then connect them to the curves accordingly.

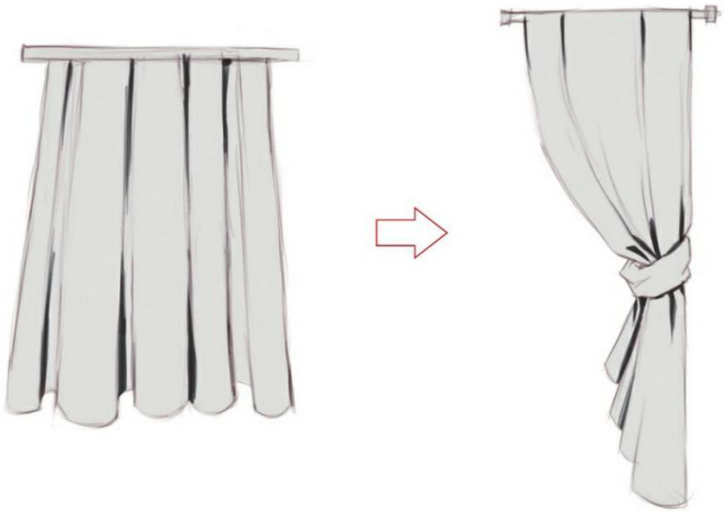
The support points are used to create a complete display of folds in the clothing.



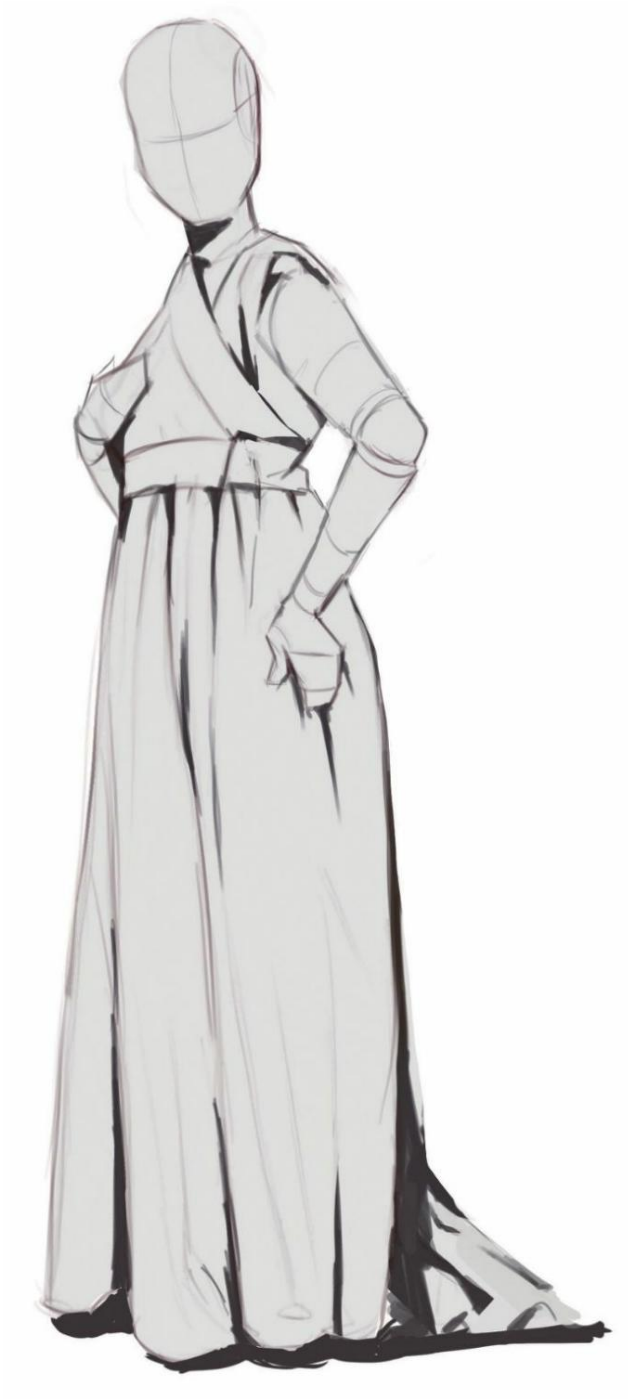
9.2.2 Tubular

Tubular pleats are a type of drape pleat, formed when fabric is suspended from a single point and the rest is pulled down by gravity. The shape of this pleat resembles a cone, with the apex of the cone serving as the support point for hanging the garment. The image below shows a cross-

sectional view of a tubular pleat and an illustration of its effect when compressed.



Tubular pleats typically appear at the hem of a long skirt or around the waistband.

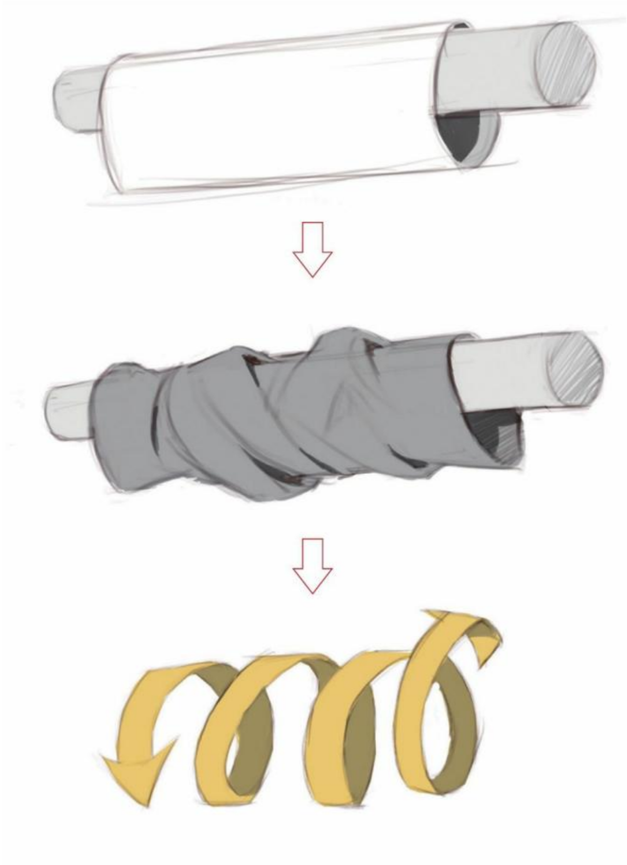


9.2.3 Spiral

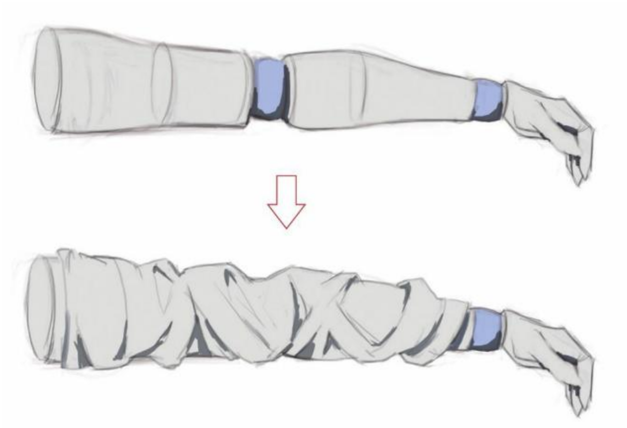
When fabric is wrapped around a cylinder, it compresses and twists, creating spiral folds that radiate outwards from the support. These folds typically appear at curved joints wrapped in fabric, such as...

Elbows and other similar areas.

Unlike semi-closed pleats, spiral pleats do not compress and stretch simultaneously, but rather enclose... The cylinder is compressed evenly and the compression is so great that it produces through-folds.



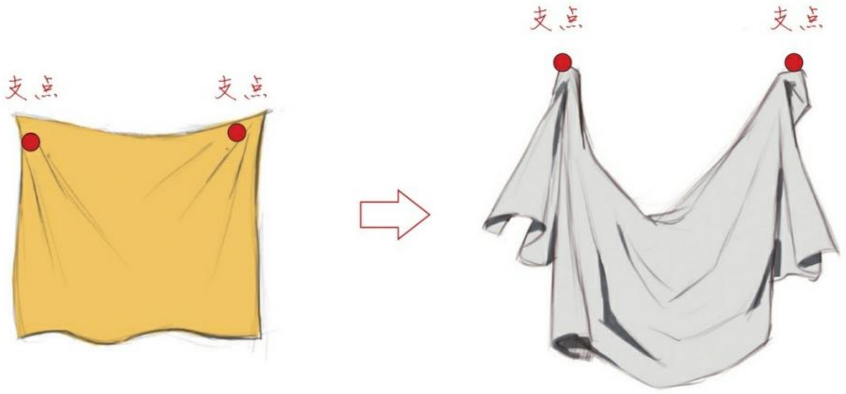
The structure of the spiral folds is shown below.



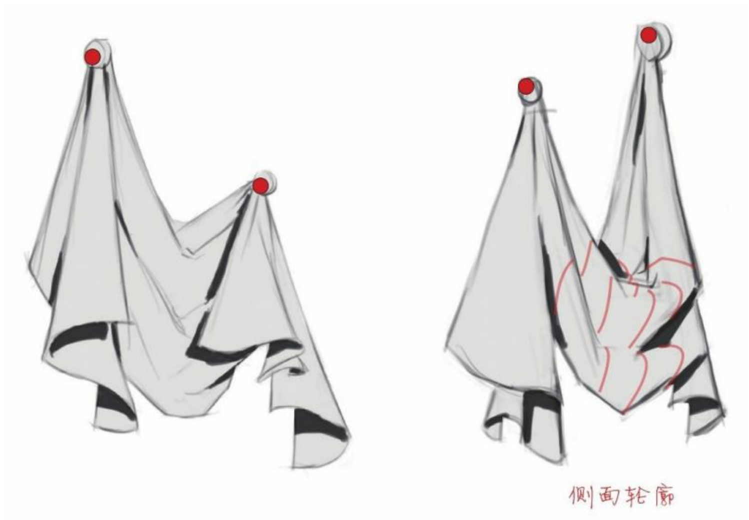
9.2.4 Cloth-type

A pocket-shaped pleat is formed when the two ends of a piece of fabric are fixed at a certain distance, while the rest...

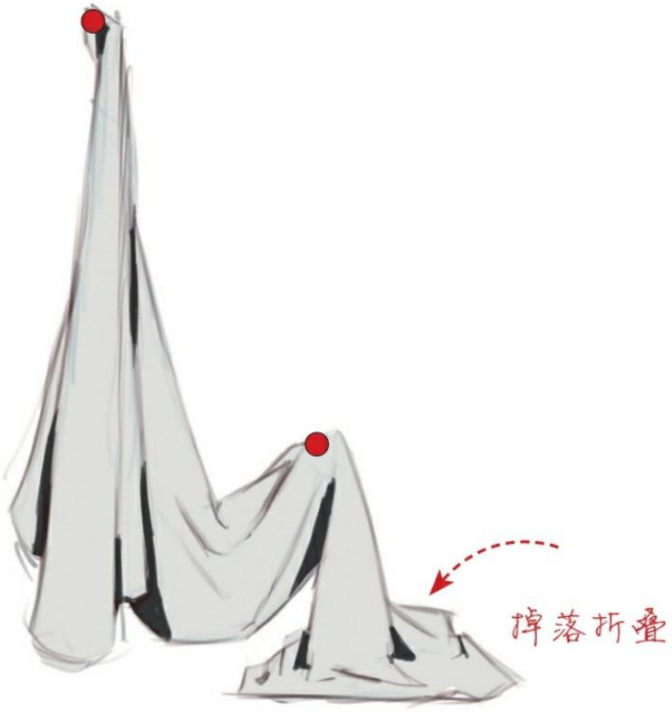
The parts droop due to gravity, which creates several sets of "V"-shaped folds, which become looser towards the bottom.



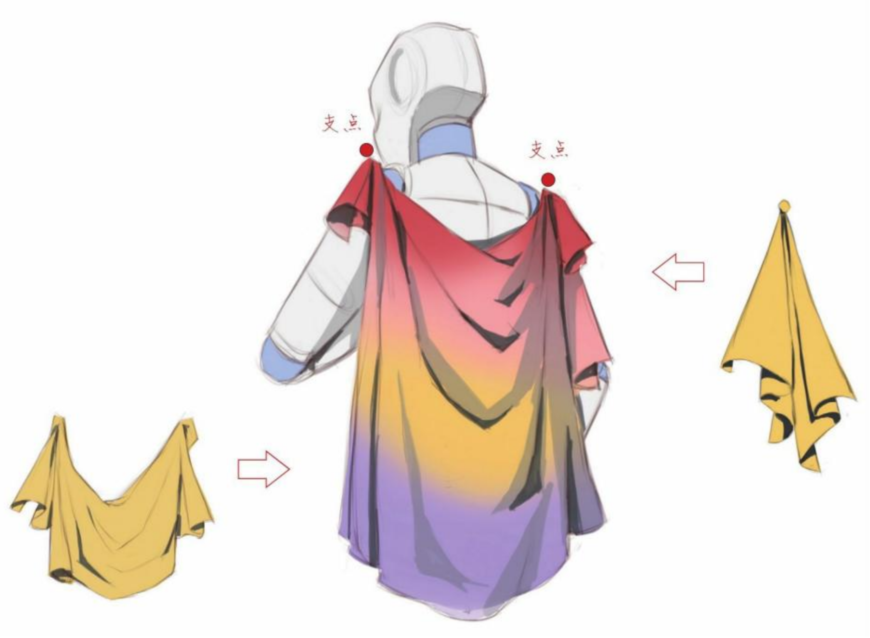
The following diagram illustrates the effect of the pleats at different support points and their side view.



The combined effect of pocket-shaped pleats and drop-down folds is illustrated below.

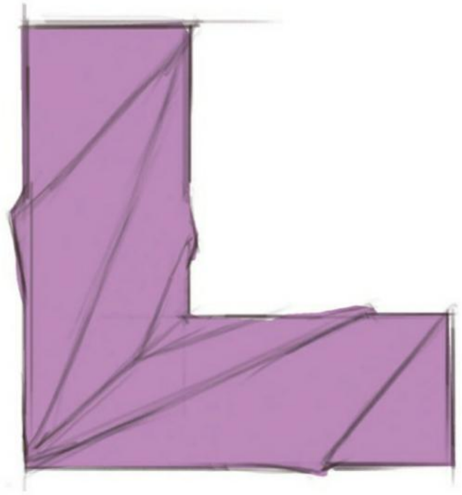


When a person wears a shawl, it creates very typical pocket-like folds. Below, I have used color to mark the pocket-like folds that change due to the influence of the weight fulcrum on the shawl.



9.2.5 The "ÿ" shape

The "Z" shaped pleat is a hybrid pleat, where the fabric is subjected to both gravity and resistance. This type of wrinkle is created over time. It often appears at the collar of high-necked garments, wrists, and trouser legs. The image below shows the side view of a zigzag wrinkle.



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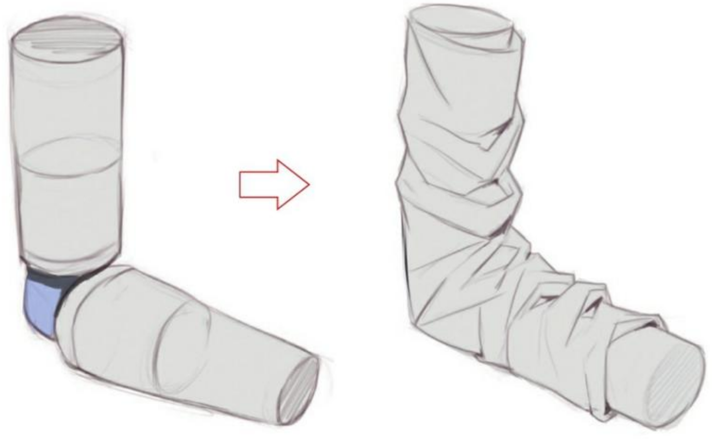
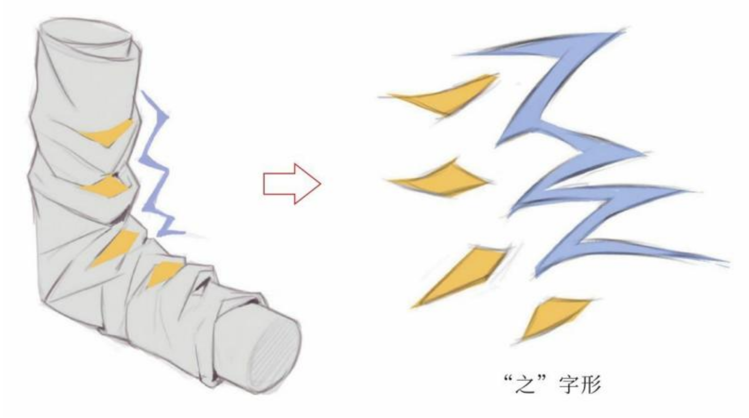
The structural principle of the "Z"-shaped pleats is illustrated below.



In painting, the closer the fabric is to the bend of the arm, the denser its zigzag pattern.

According to the perspective relationship between the upper and lower parts of the arm, the zigzag structure will also change with the perspective.

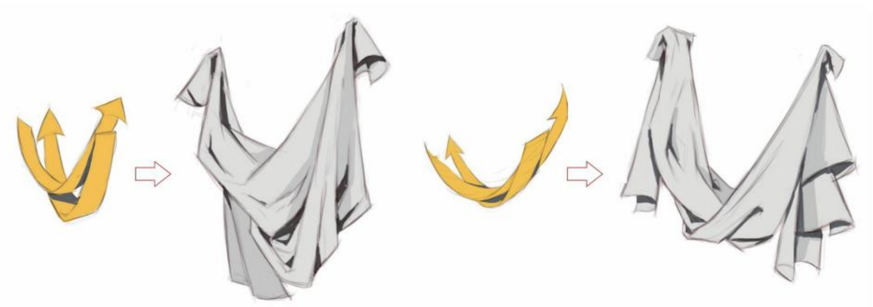


9.2.6 Half-fastener type

The principle behind the creation of semi-fastening pleats is based on the assumption that an object is covered with a layer of fabric. When the object...

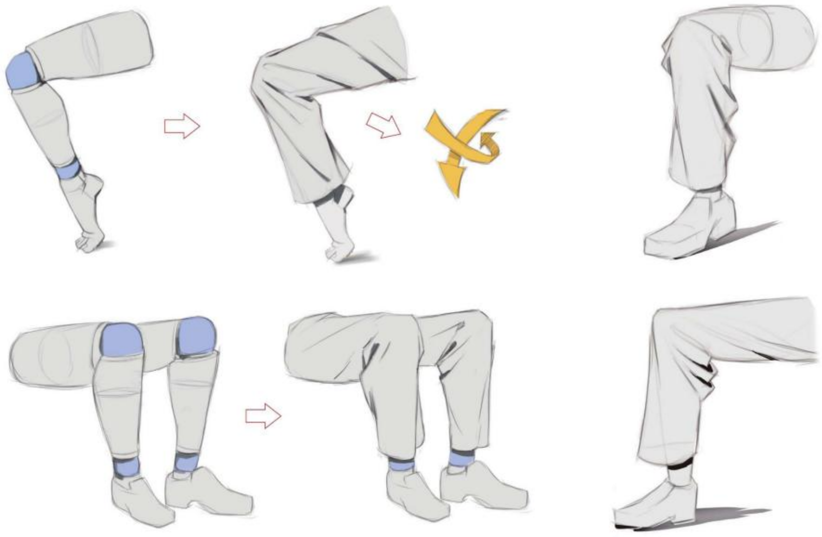
When bent to one side, a semi-closed, semi-fastening pleat will be created at the bend.

Half-button pleats often appear at the turning points of clothing. In this area, the fabric folds and wrinkles due to pressure.

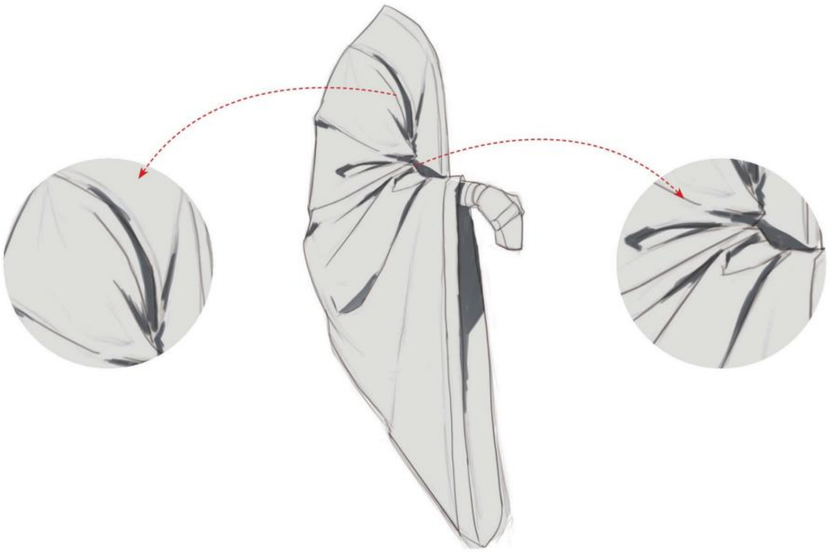


When the knee is bent, the leg pulls on the clothing, causing more fabric to show behind the knee.

The raised folds.



When the arm is bent, it also creates a half-button-like crease.



9.3 Basic Exercises on Clothing Folds

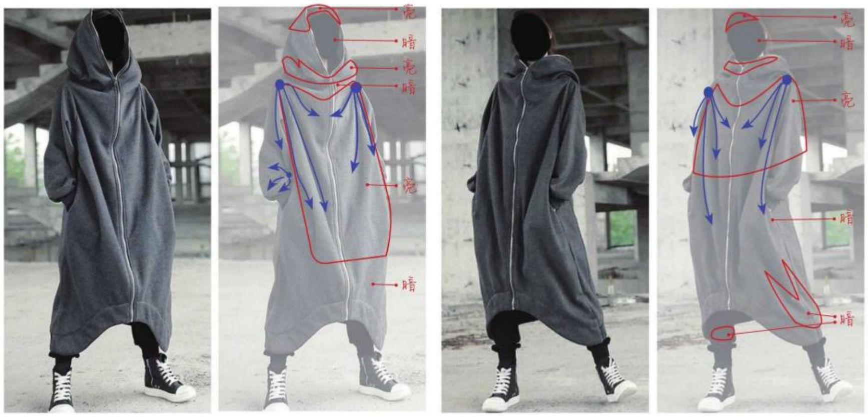
Once we understand the different types of folds mentioned earlier, we can practice creating a comprehensive representation of folds. Generally, we need to depict one or more types of folds. The most important thing in this process is to learn how to analyze the forces acting on the folds and simplify their structure.

9.3.1 Practice in summarizing clothing folds

When practicing drawing clothing folds by referring to real objects or photographs, we often find the folds very complex and difficult to begin. We can simplify the complex fold structure using previously learned knowledge and then exaggerate it to create more tension in the folds. Taking the image below as an example, analyze the blue support points in the

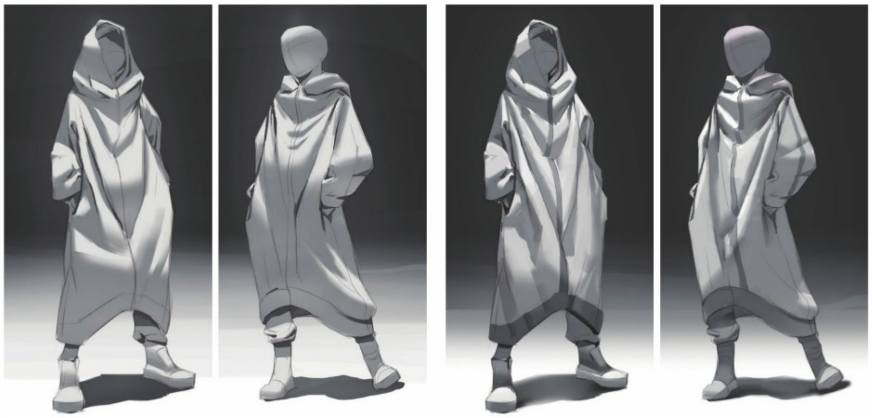
photograph, noting that each support point extends outwards.

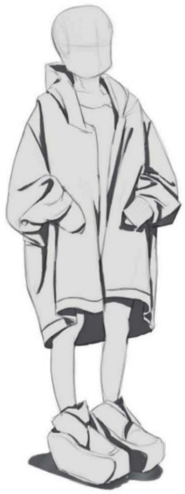
No more than four loose folds, otherwise it will look messy. Don't draw too many blue support points; just draw a few main and obvious ones. Roughly outline the lit and shadowed sides of the clothing, trying to follow the pattern of light and dark transitions; this will make it look more organized.

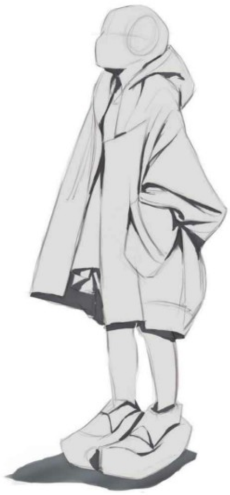


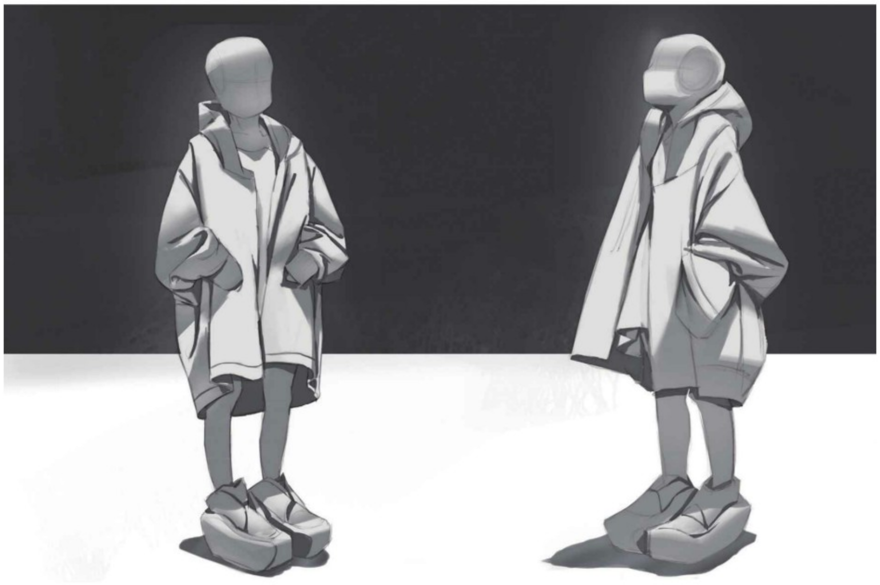
After analysis, draw the line art, black out the areas completely unaffected by light, and make the lit and shadowed sides different.

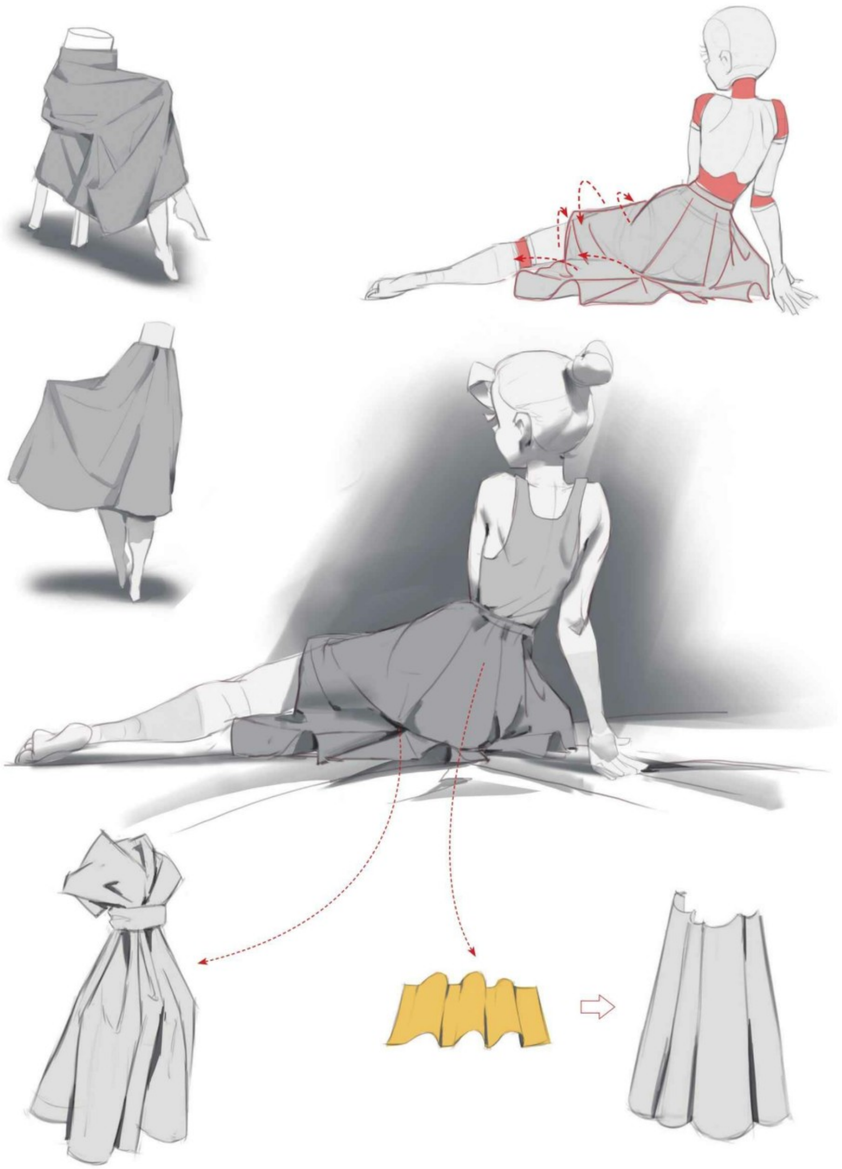
The transition between smooth surfaces should be more natural.

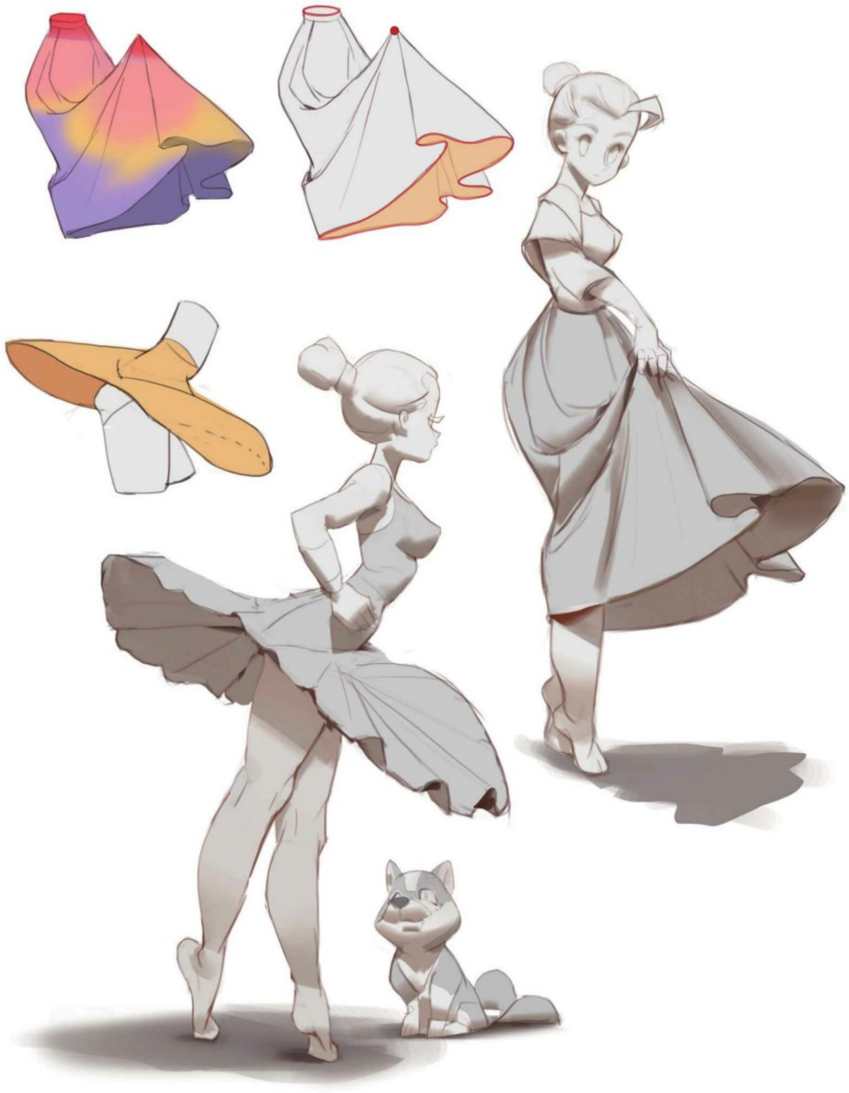


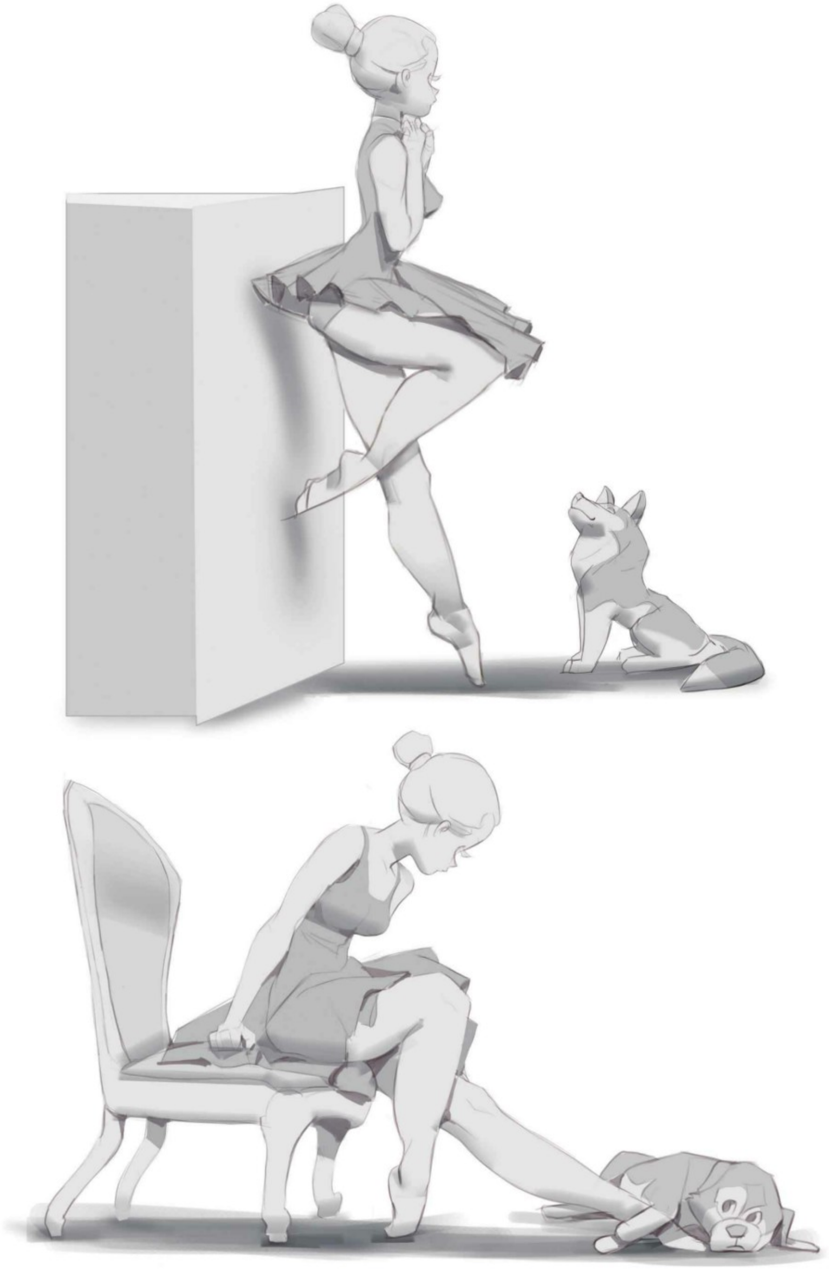


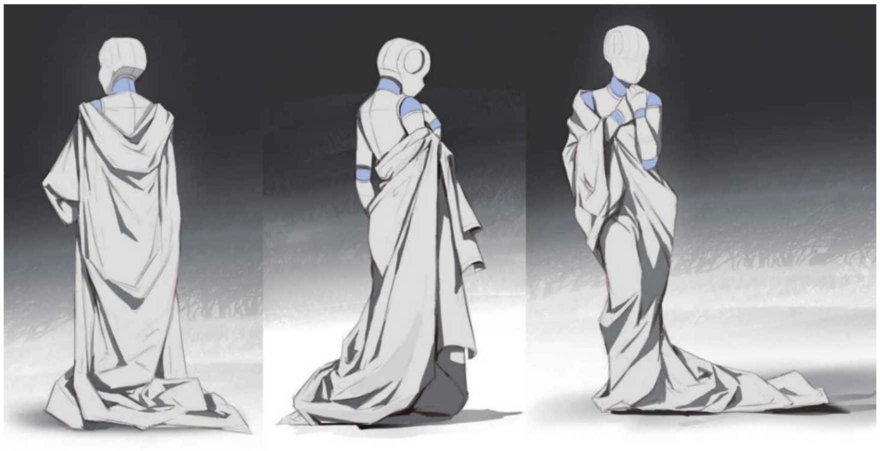


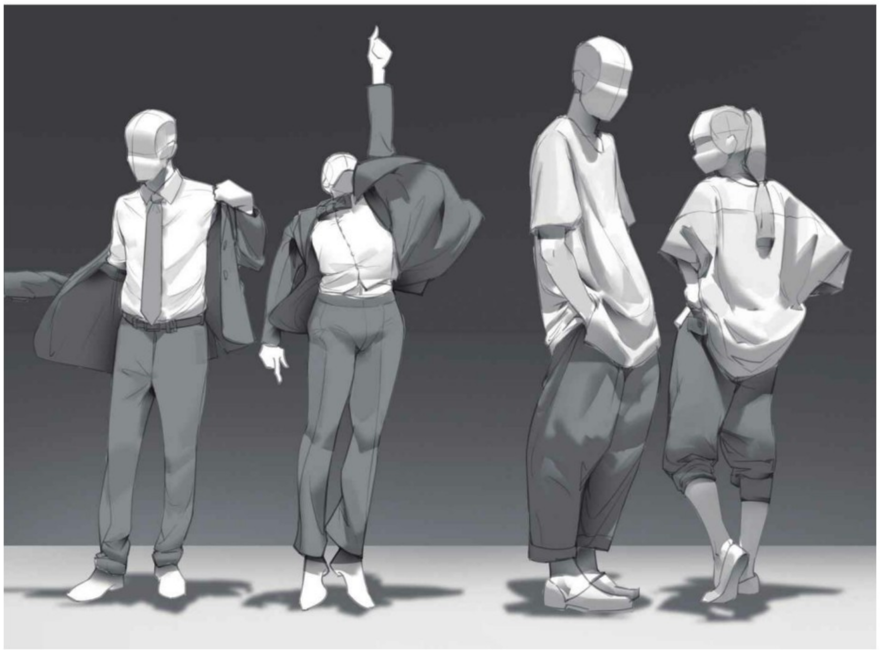


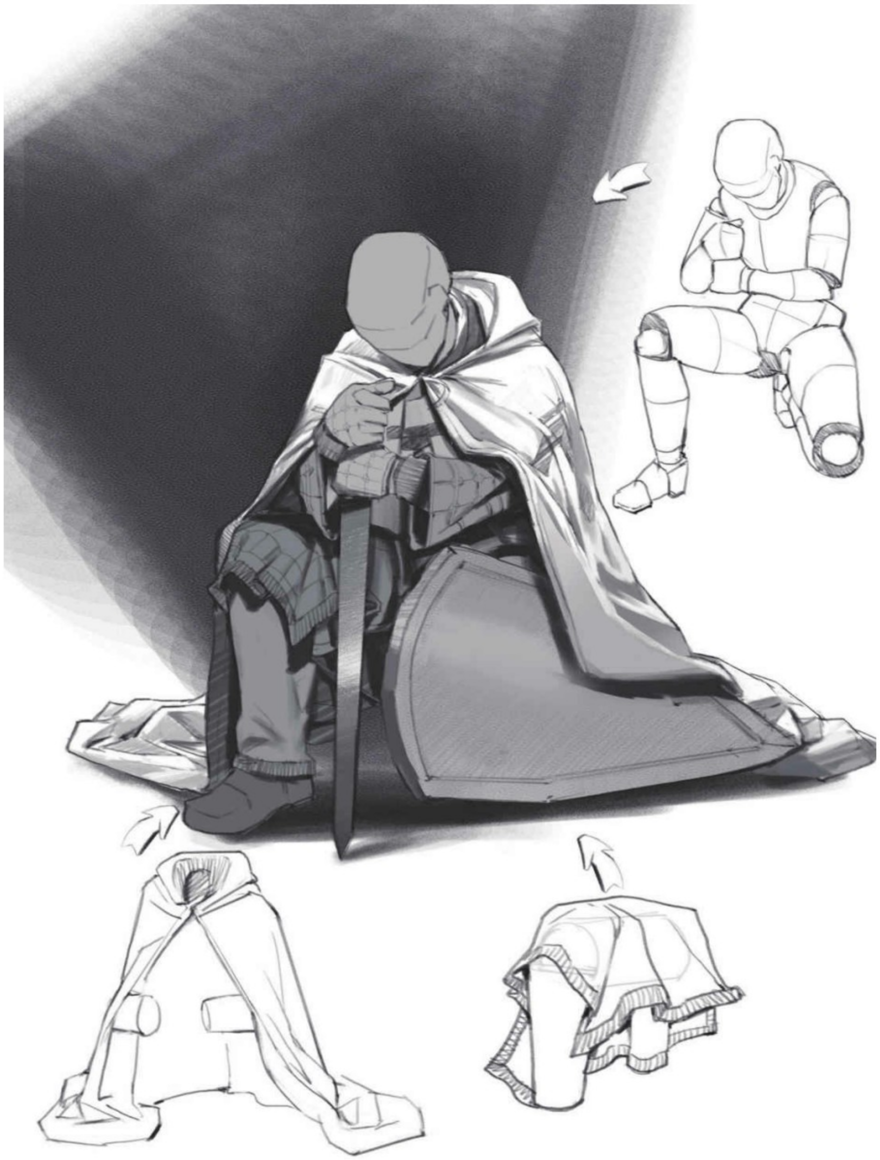


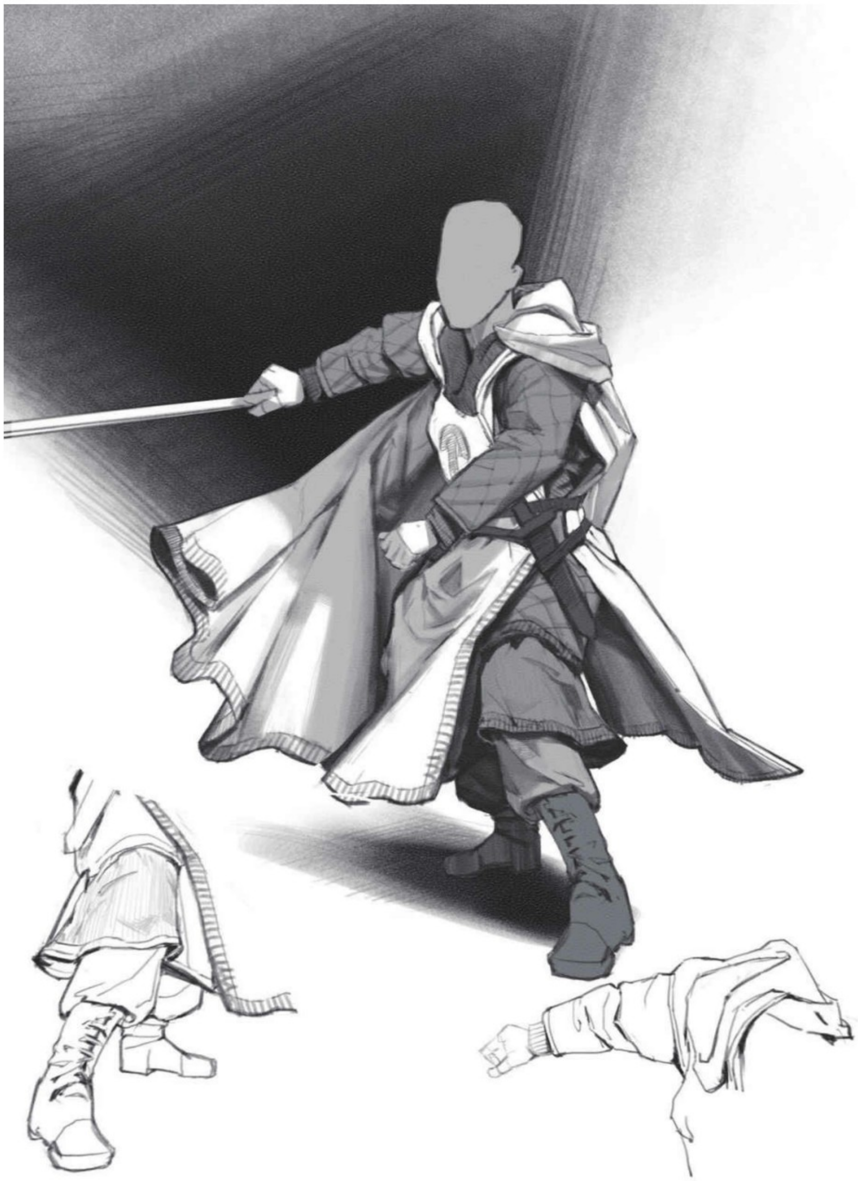


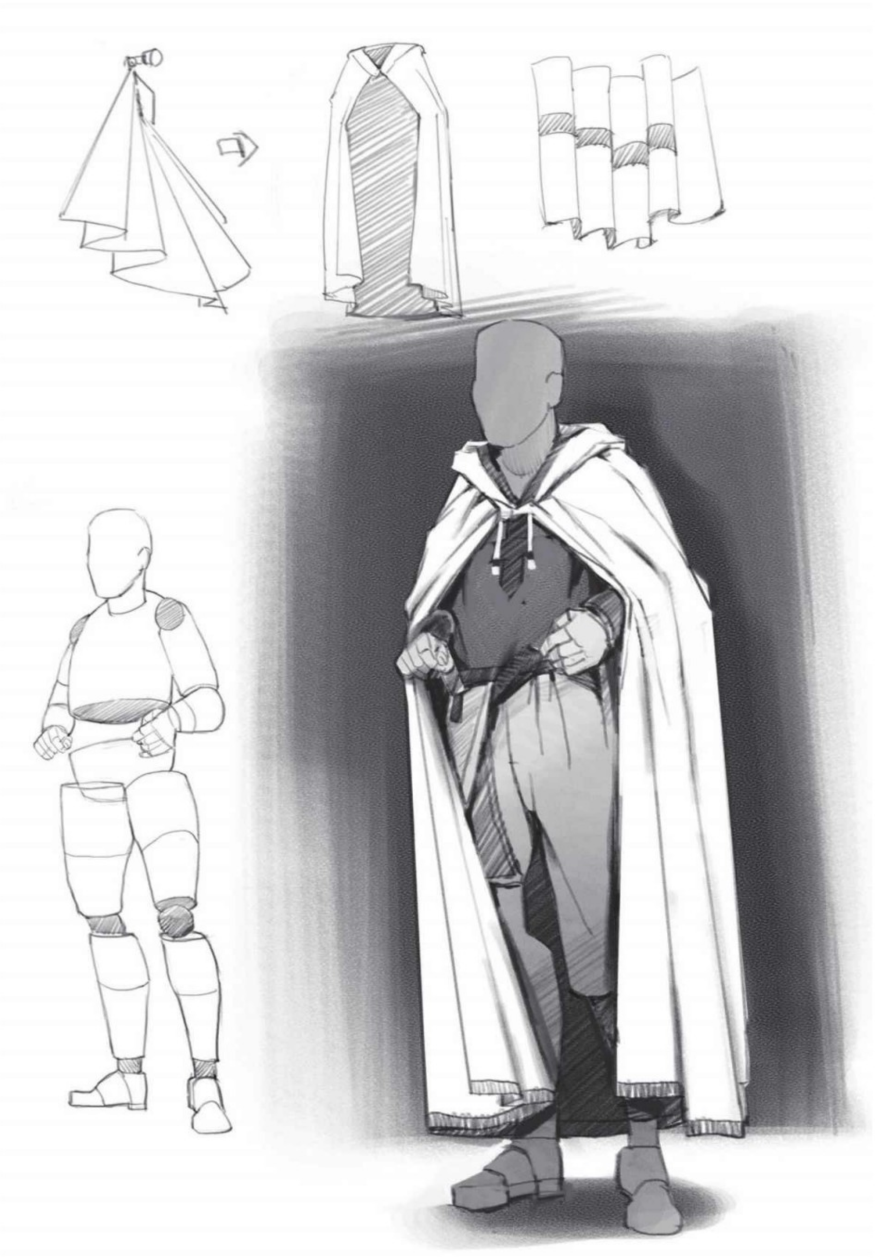


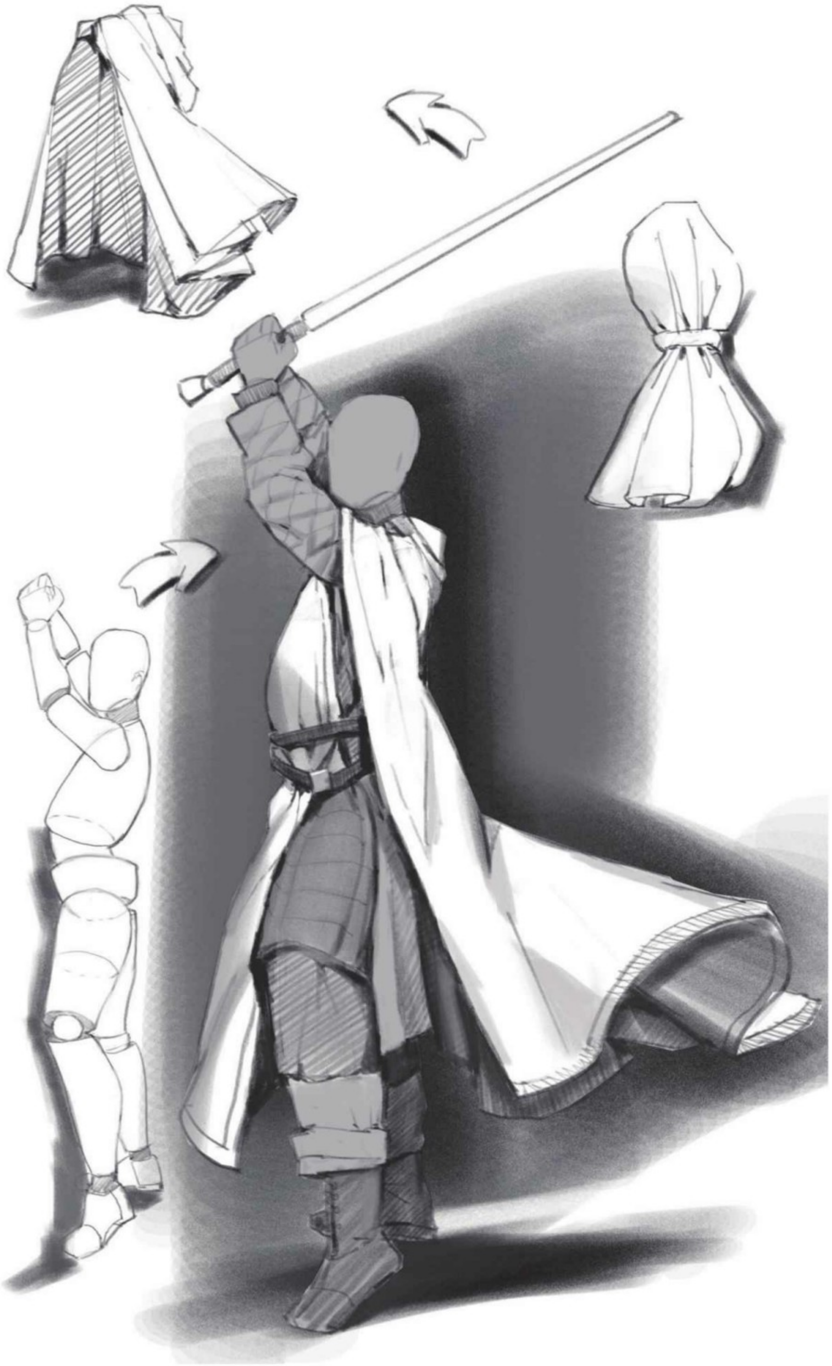


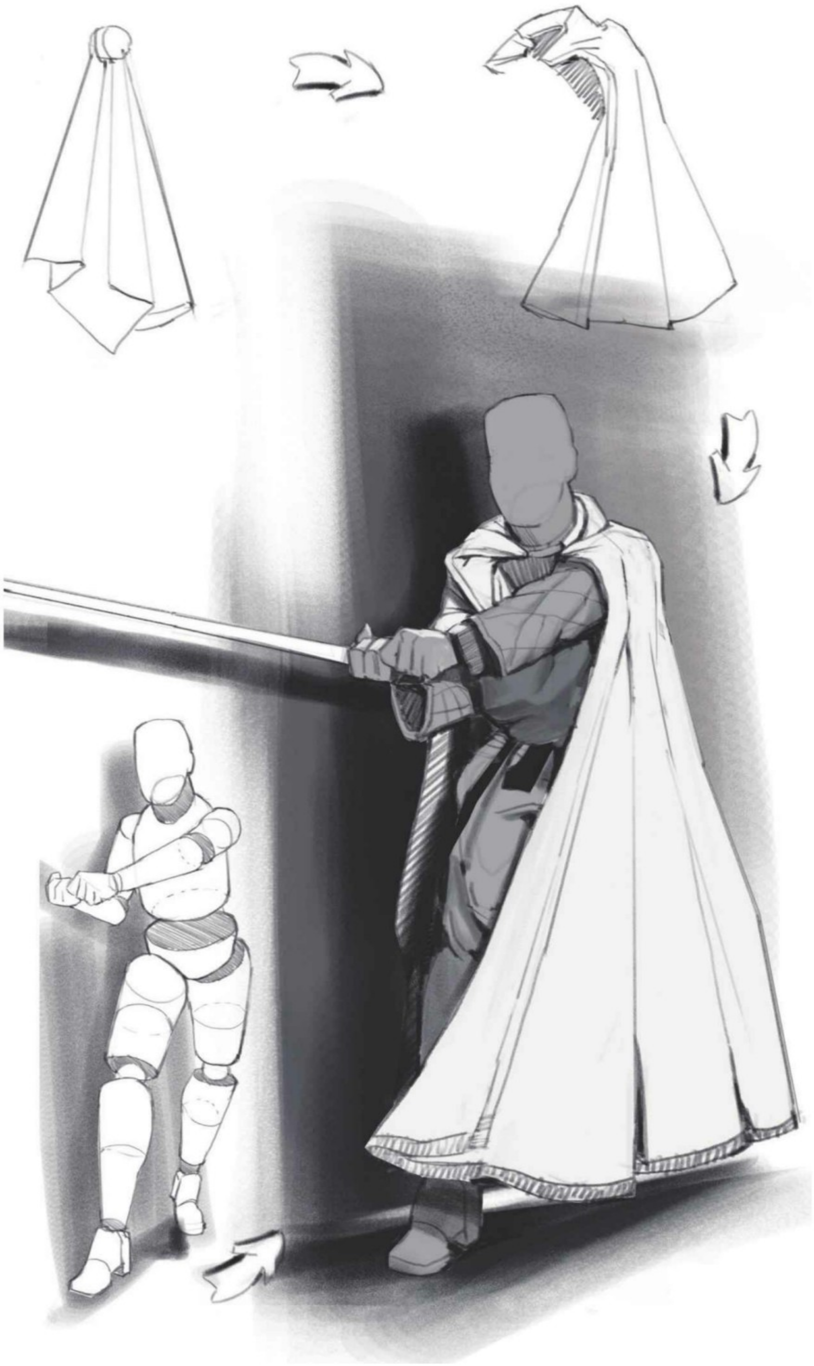


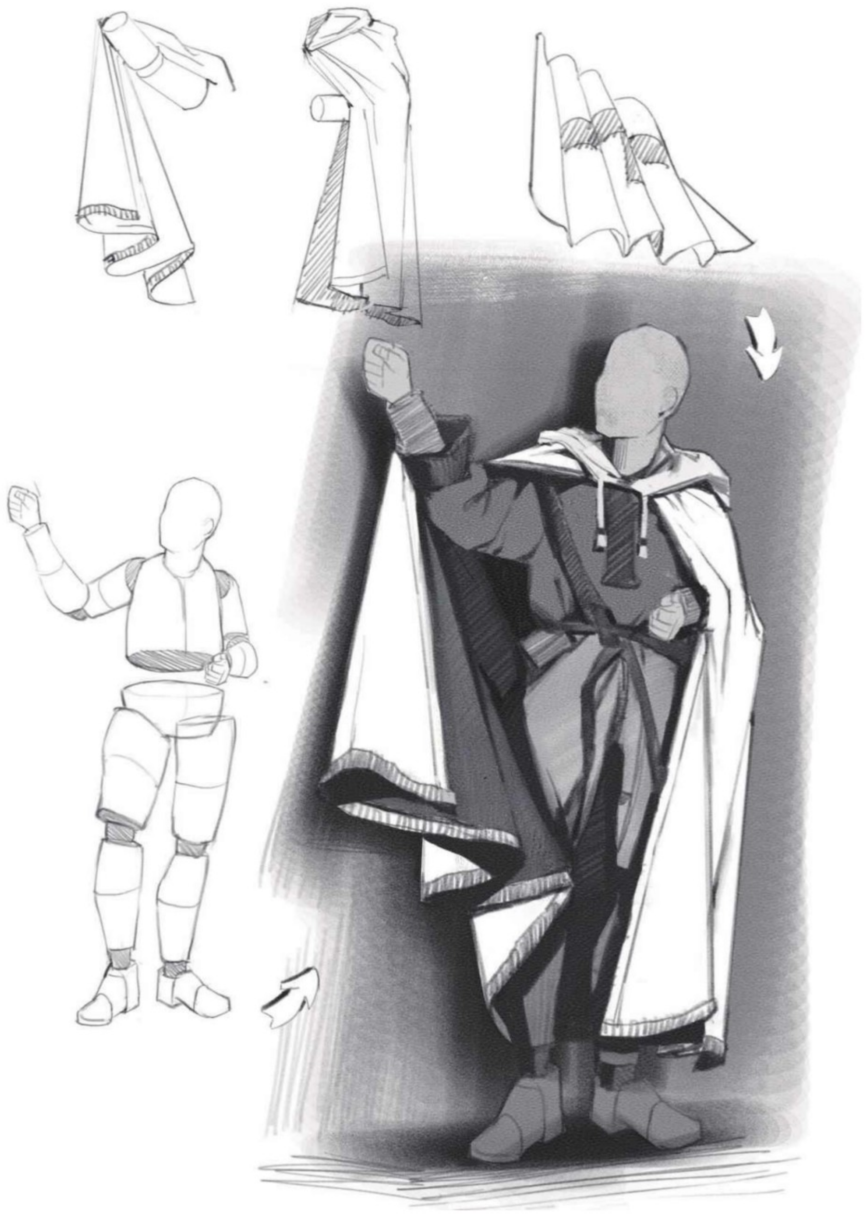


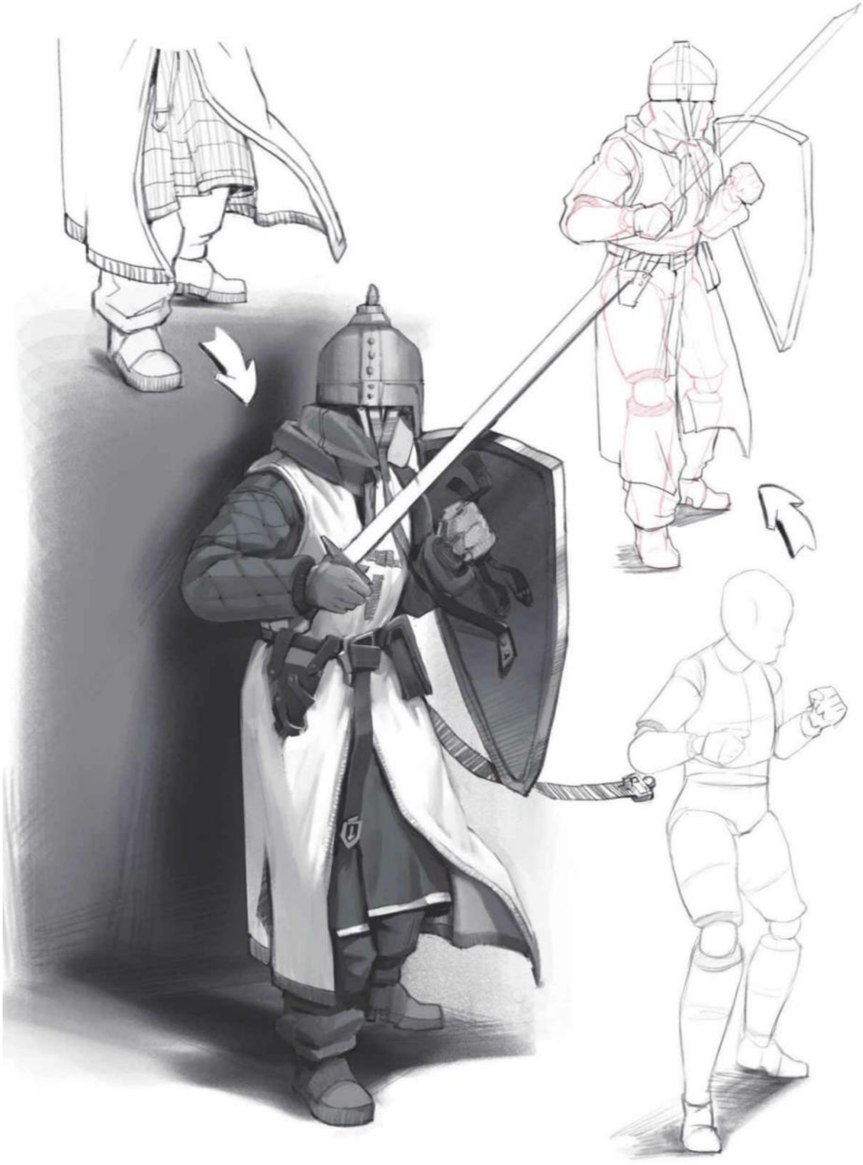












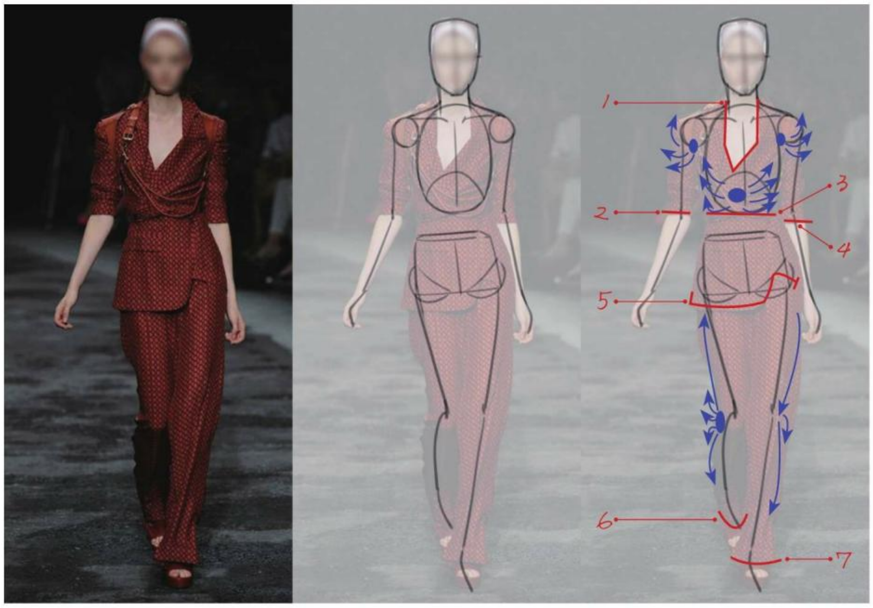
9.3.2 The Relationship Between Clothing Folds and the Human Body

After learning how to draw the human body, what everyone wants to do most is to "dress" the human body. However, it is far from enough to simply analyze and summarize the relationship of clothing folds in photos. You also need to learn to analyze the cutting and segmentation effects of clothing on different people.

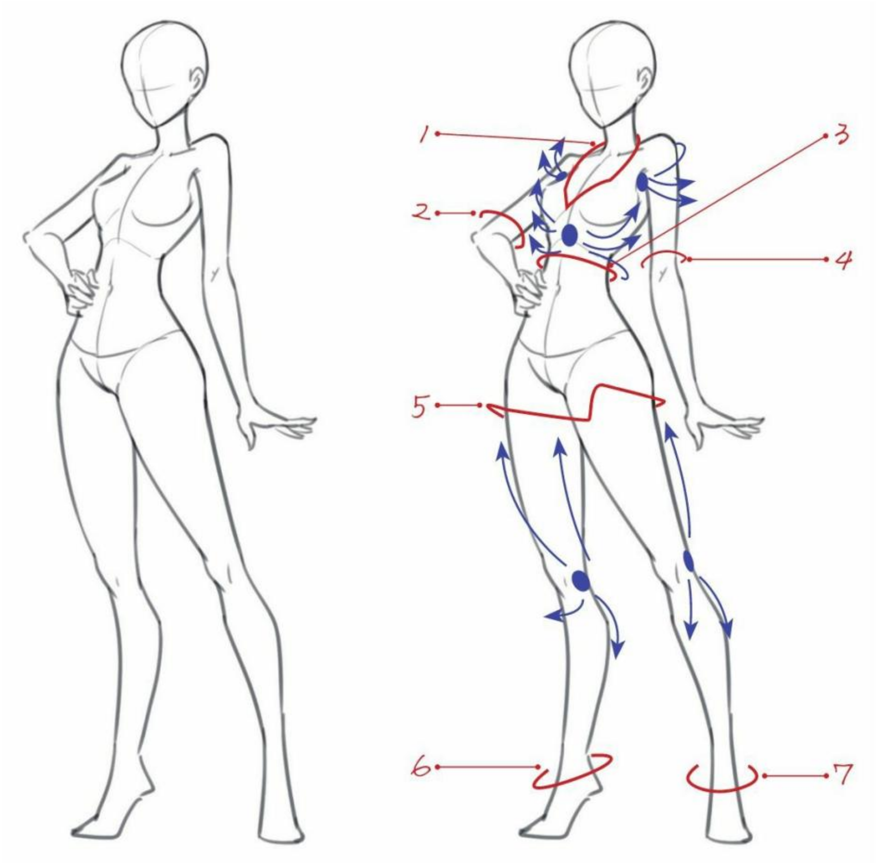
The concept of clothing tailoring discussed here differs from that in clothing design; it refers to how clothing shapes and shapes a person. Divide the body into appropriate proportions. After dividing the body into proportions, draw the folds of clothing according to the contours of the human body.

This is how to make the drawn human figure realistic and beautiful. Here's a training method using photographs as a reference.

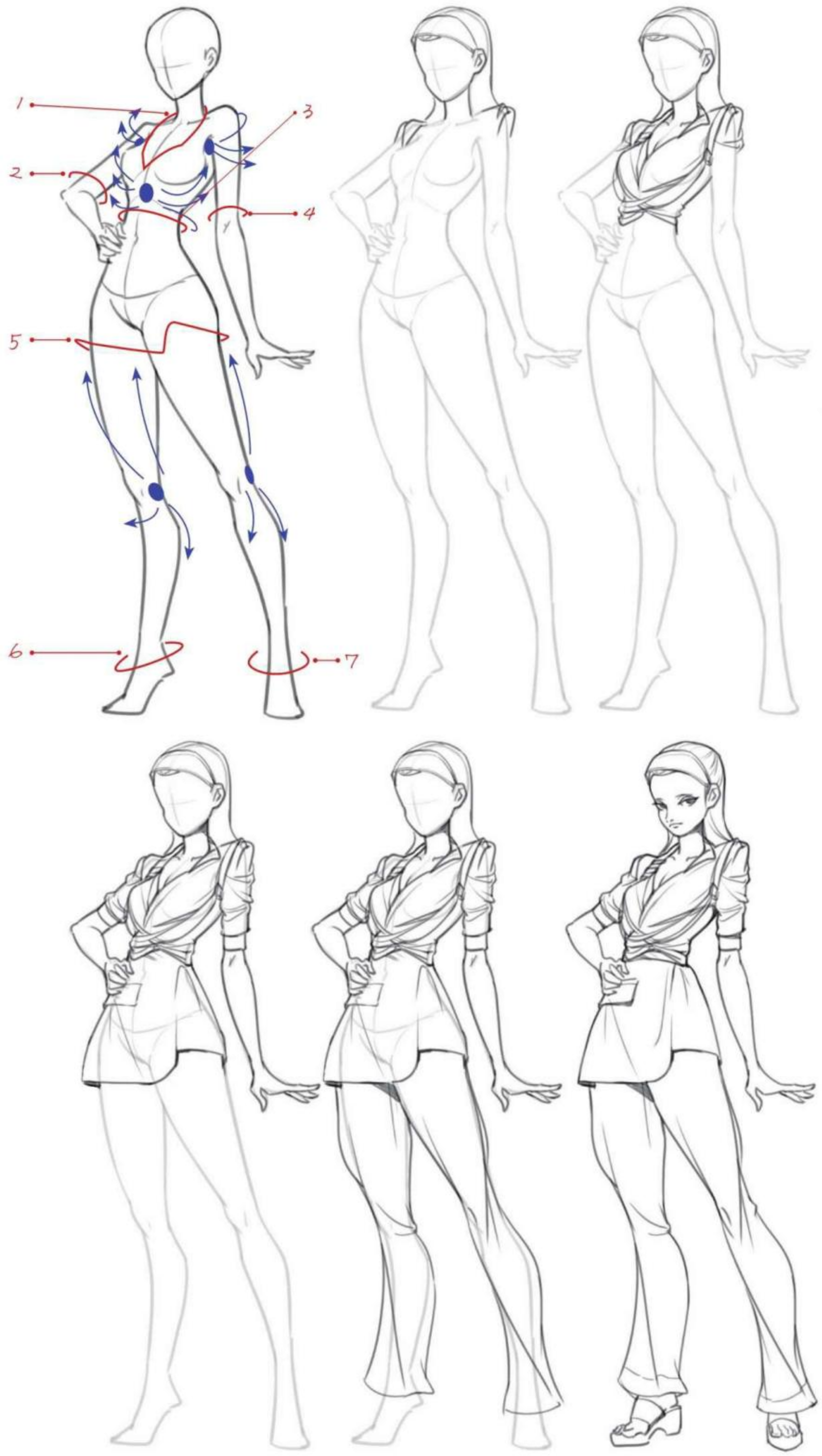
Choose a photograph, preferably a fashion show photo, analyze the structure of the figures in the photo, and... The seven cutting lines of the garment are marked on the human anatomy chart (red sections). Note the positional relationship between the human anatomy and the cutting lines. Analyze the pressure points of the folds (blue sections) and summarize the most obvious and important ones.



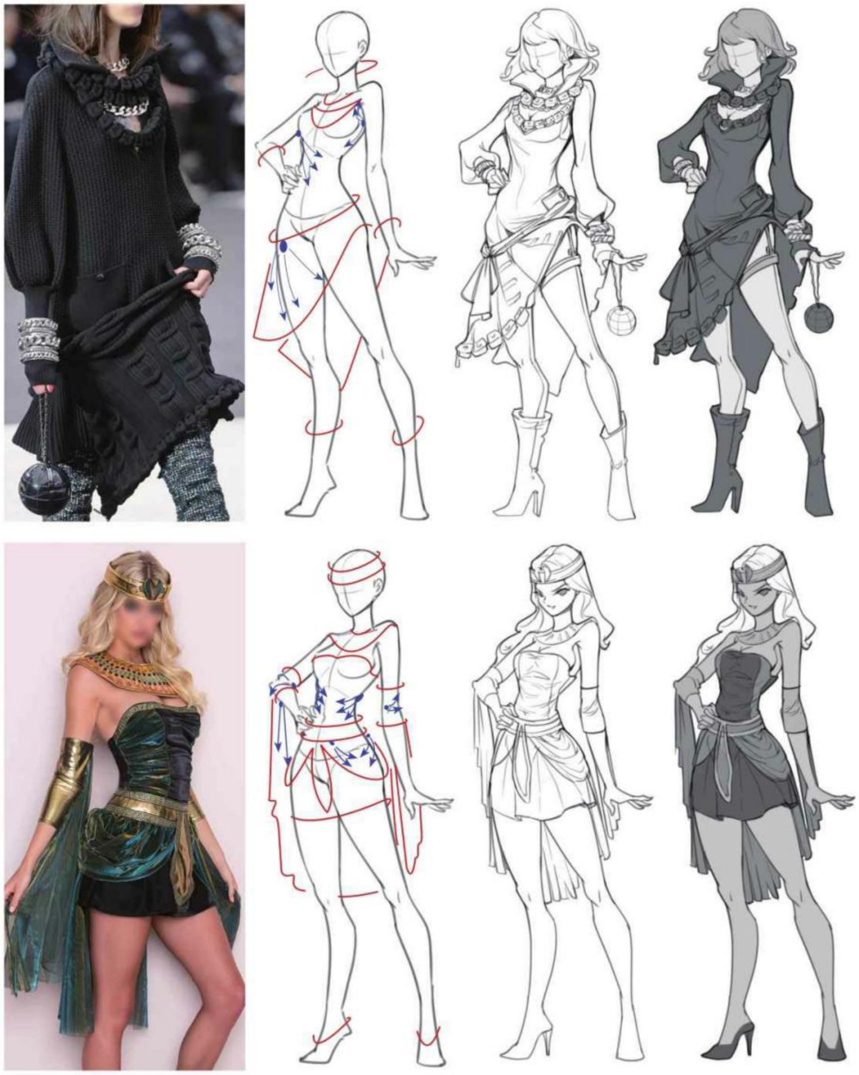
After the analysis, draw a different movement. In the new movement, find the positions of the cutting lines and pressure points that you just marked. Note that after changing the movement, we need to analyze the appearance of the wrinkles by examining the spatial relationship between the human body structure and the cutting lines and pressure points.



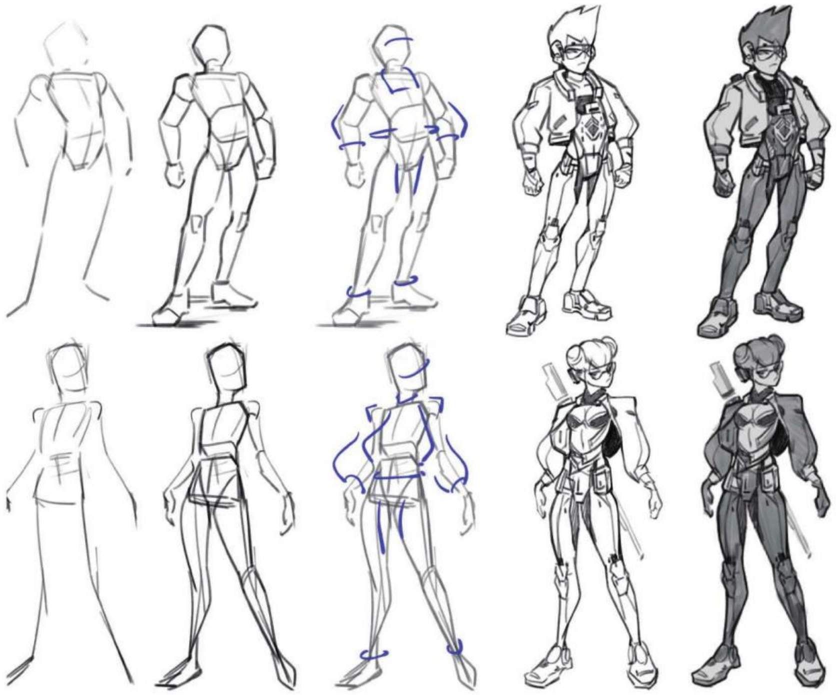
Refine based on the cutting lines and pressure points.



You can collect more photos as materials in your daily life to practice expressing the relationship between clothing folds and the human body.

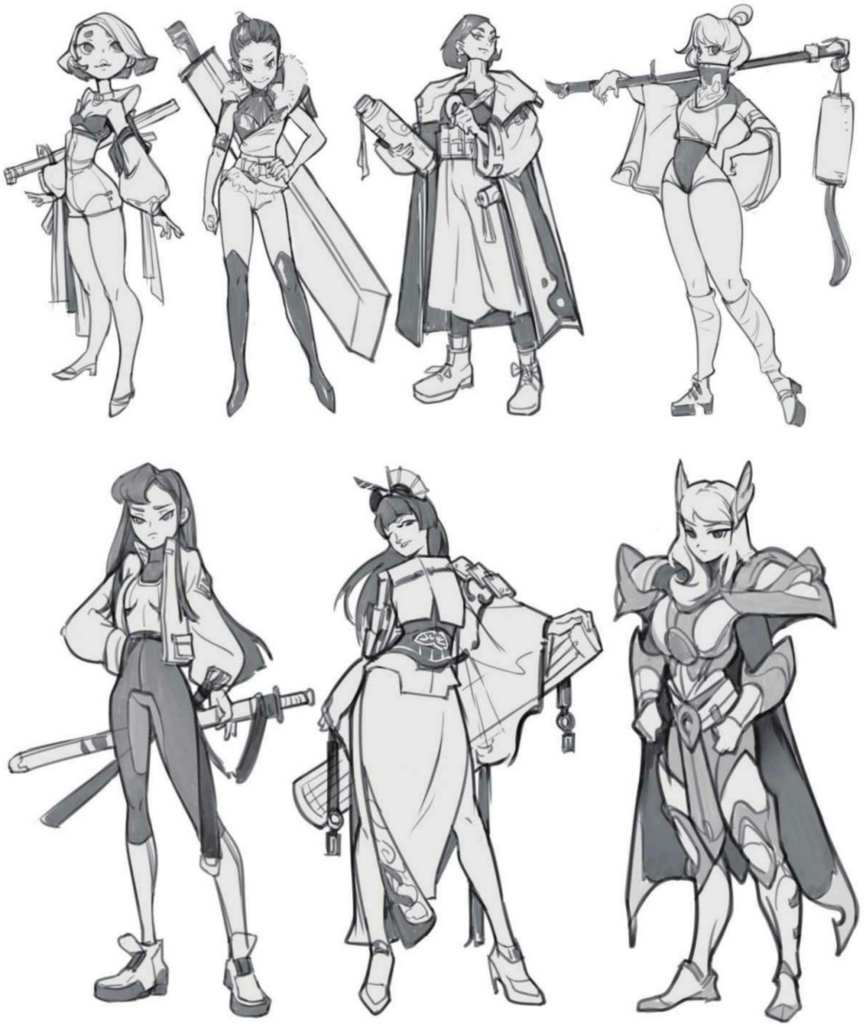


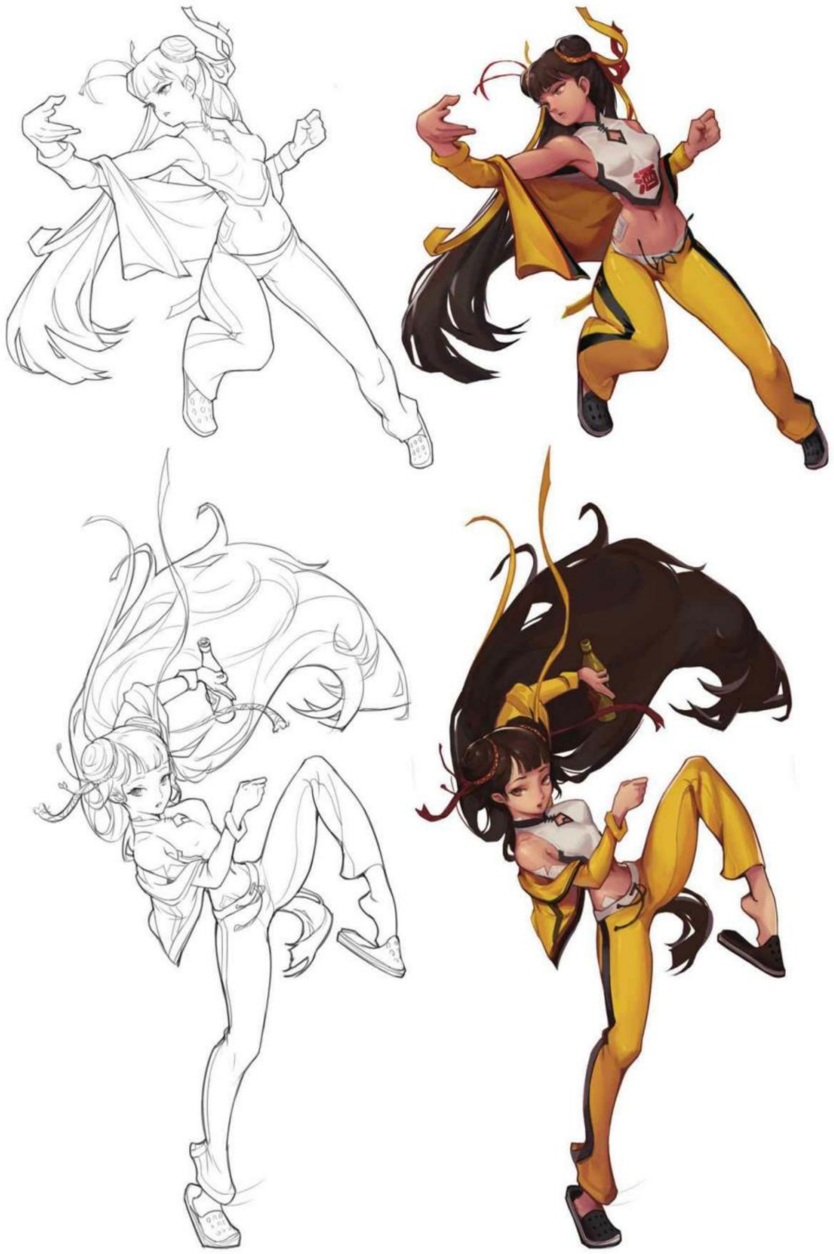
After mastering the above methods, you can set the character's actions and clothing style yourself.



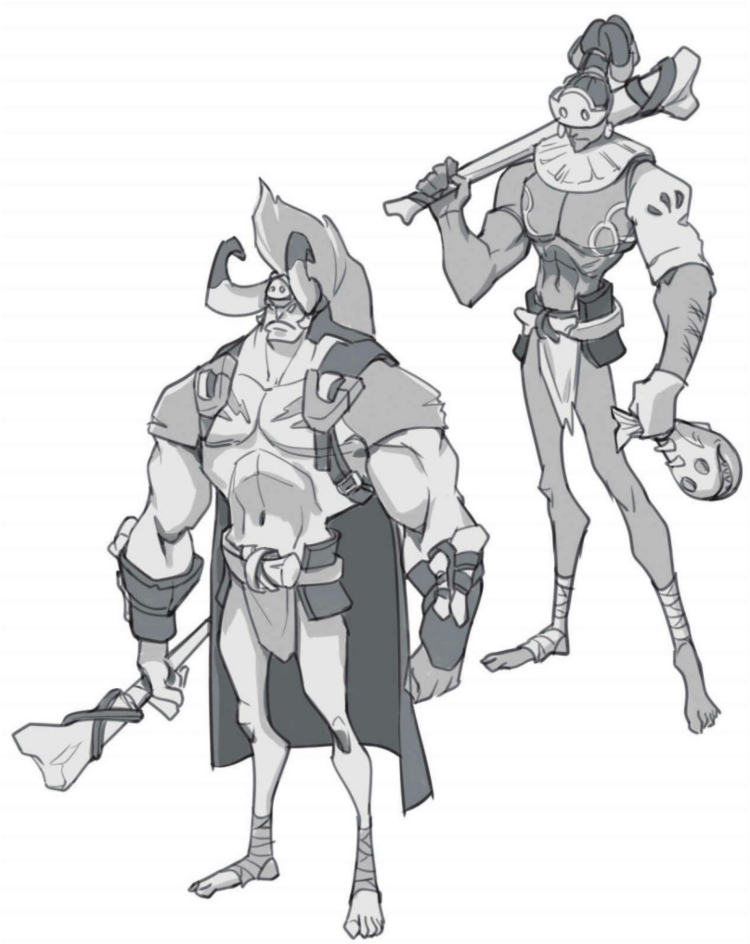
Adjust the character's body shape and movements, and then add different styles of clothing and props to make the character...

The folds in the clothing are more vivid and interesting.



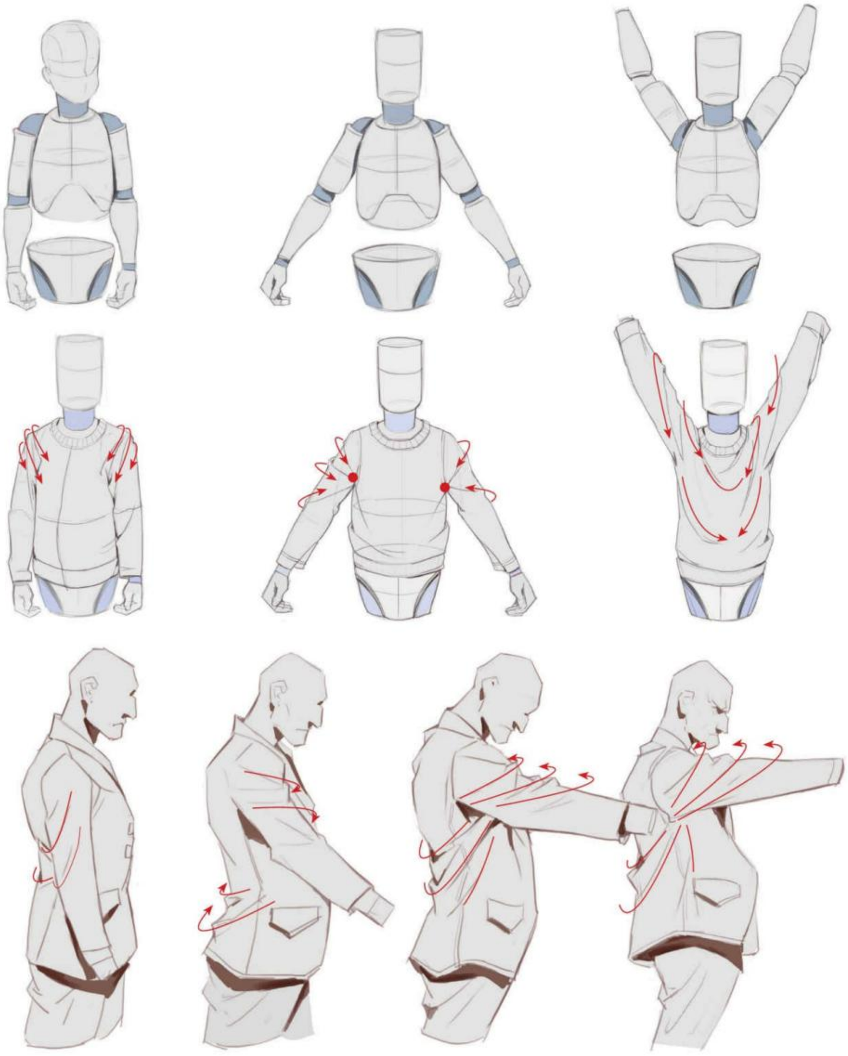


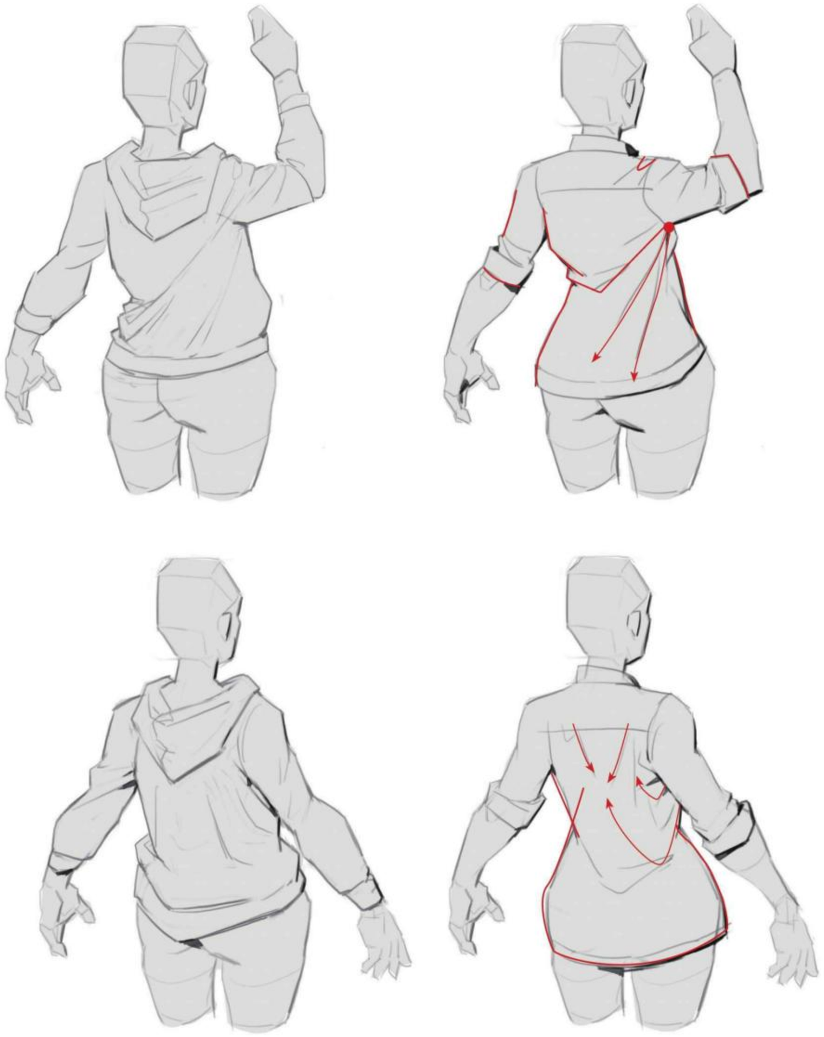
Draw more exaggerated body shapes and costumes to make the character look more American.



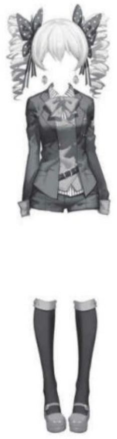
More specialized training

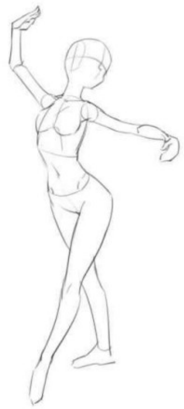
Do a set of exercises to practice the folds of clothing when raising your arms.

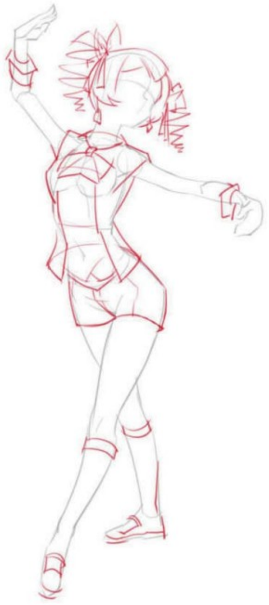


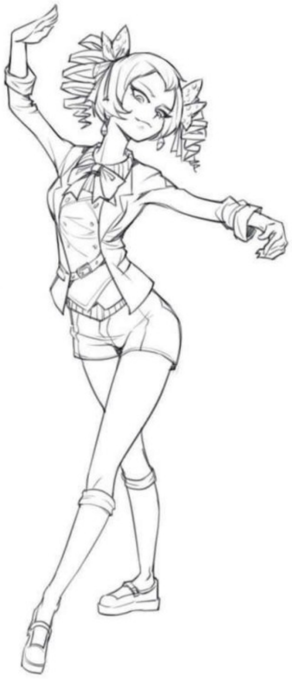


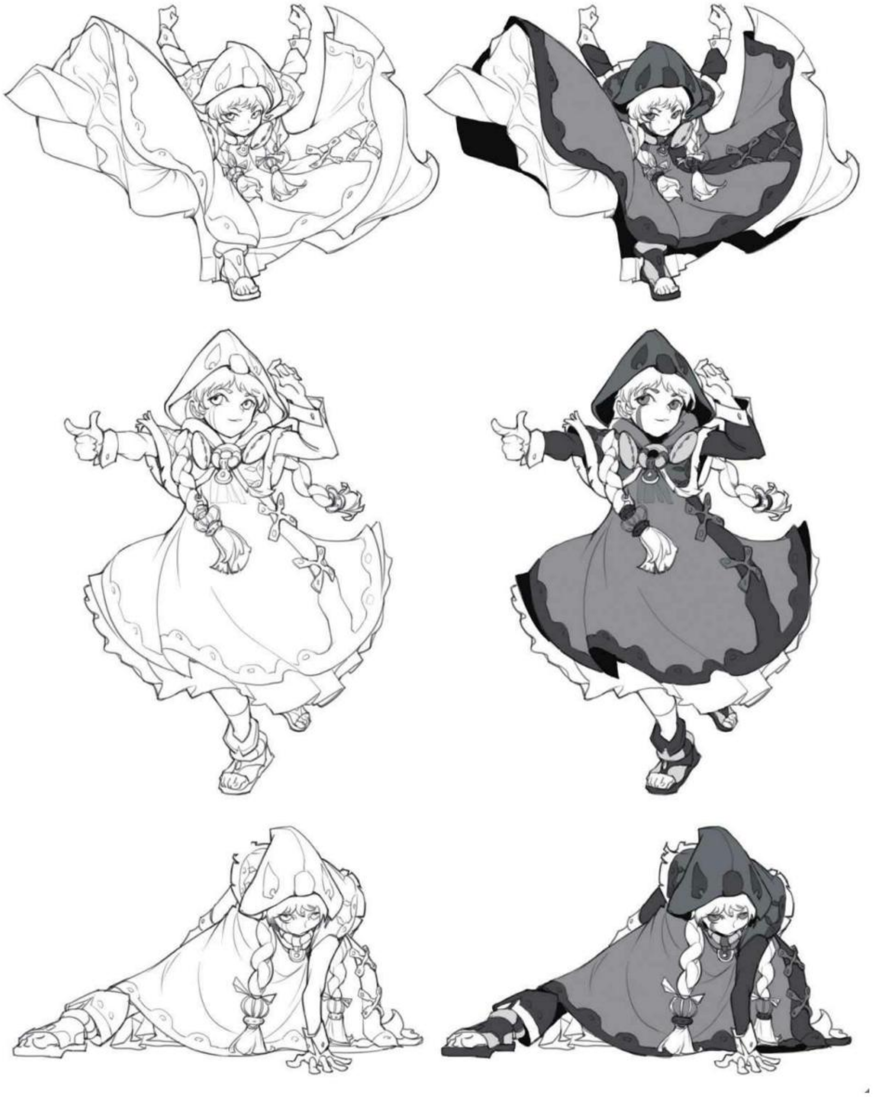
Use the reference photos to create a set of clothing designs.



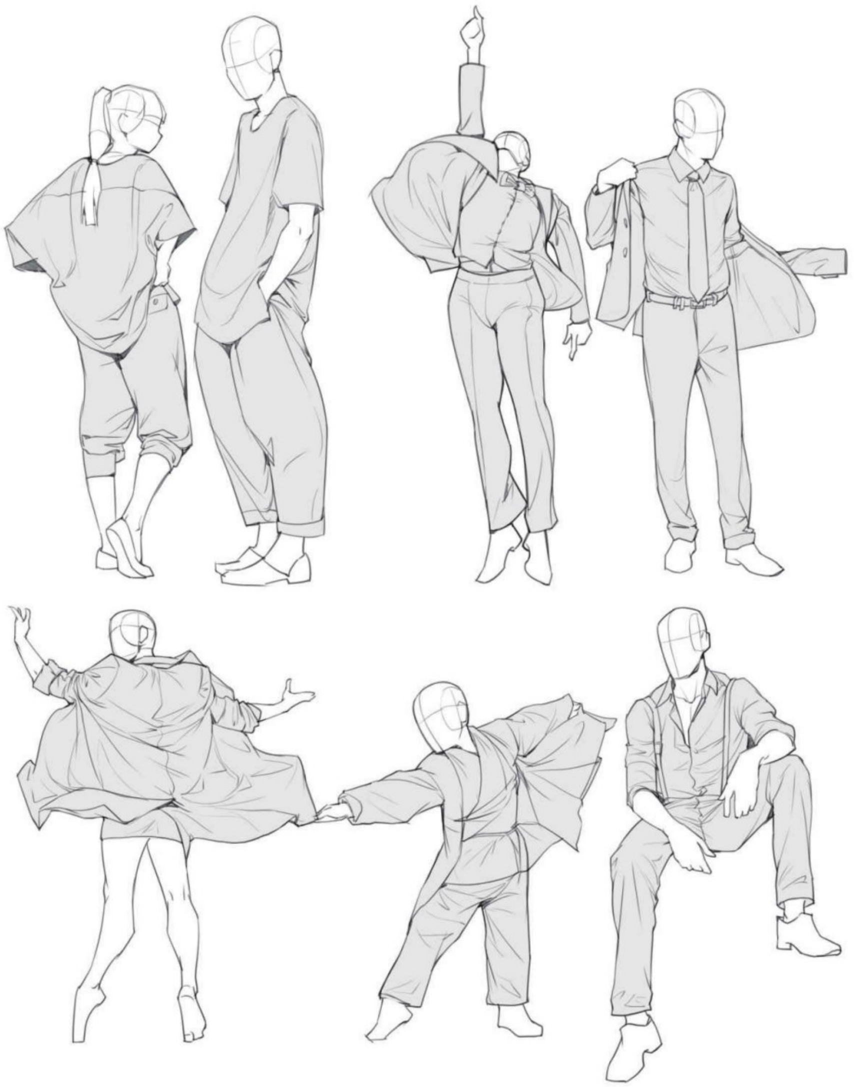


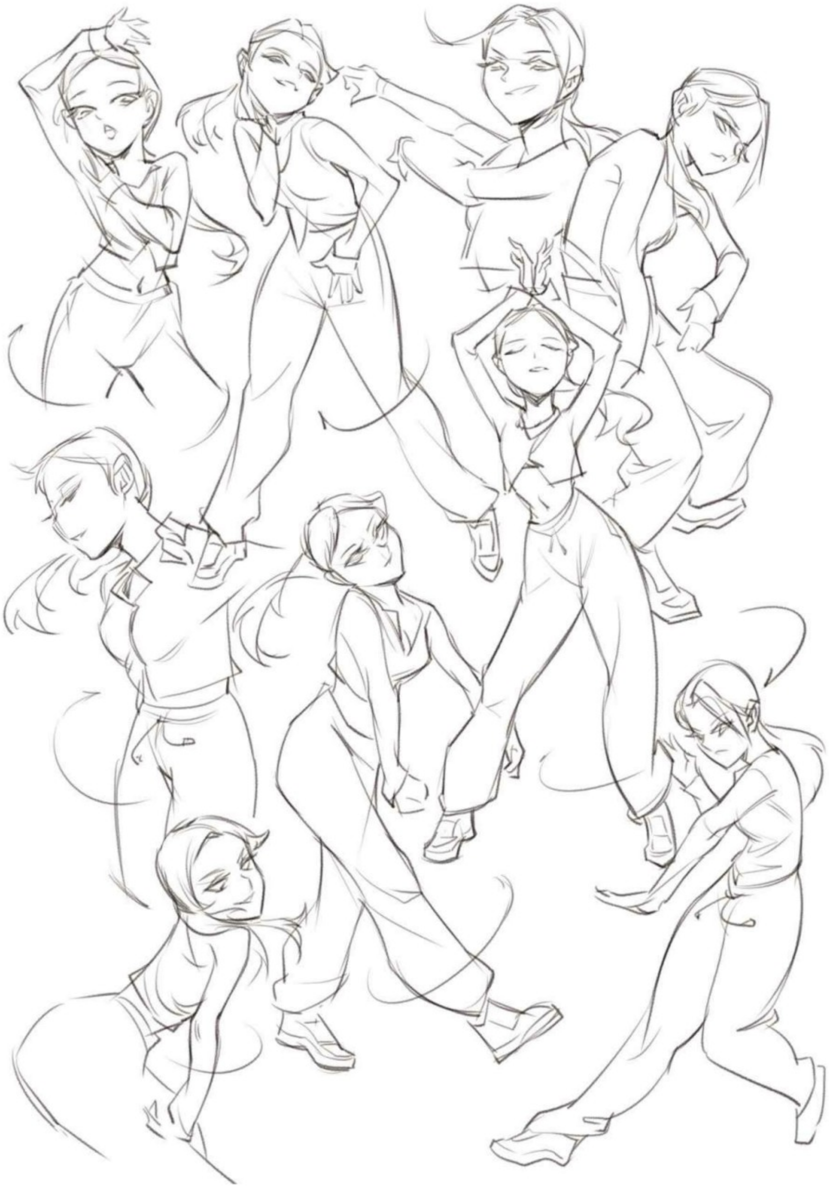


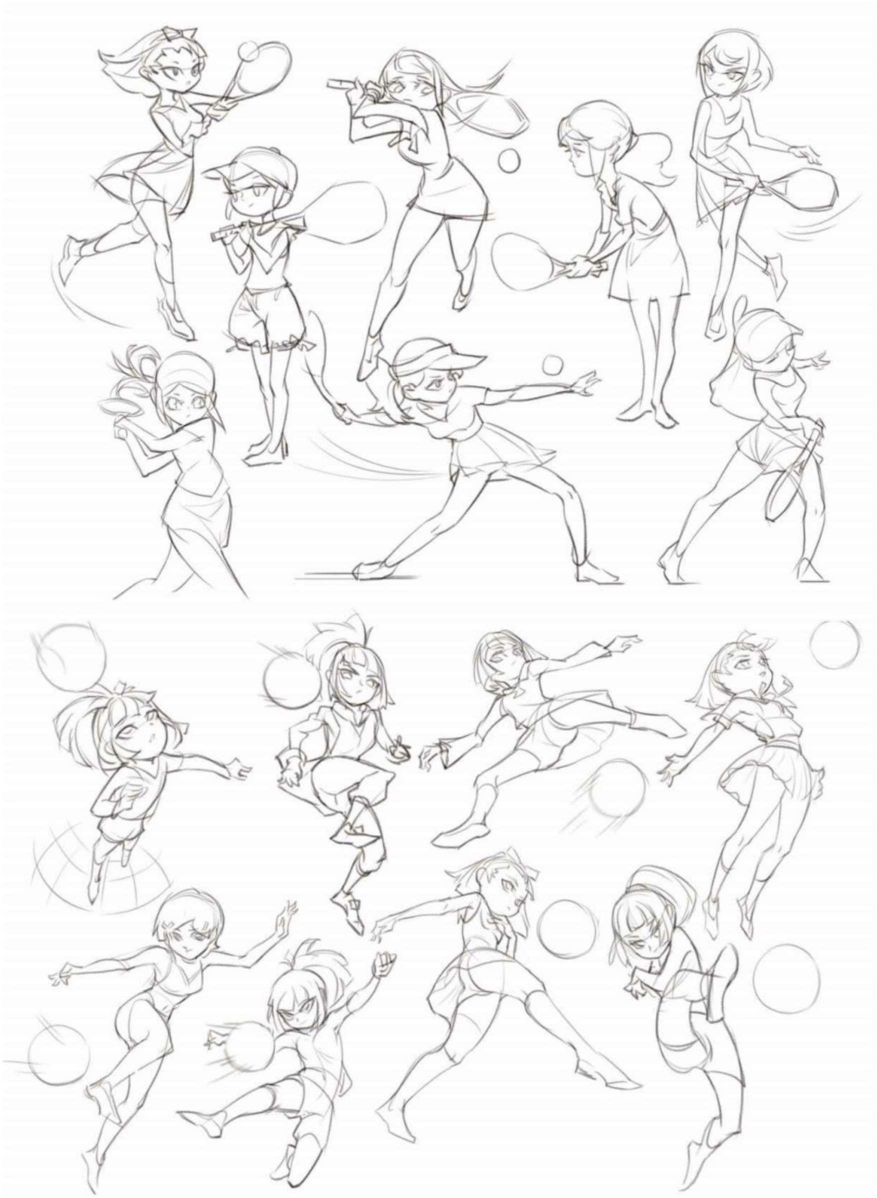


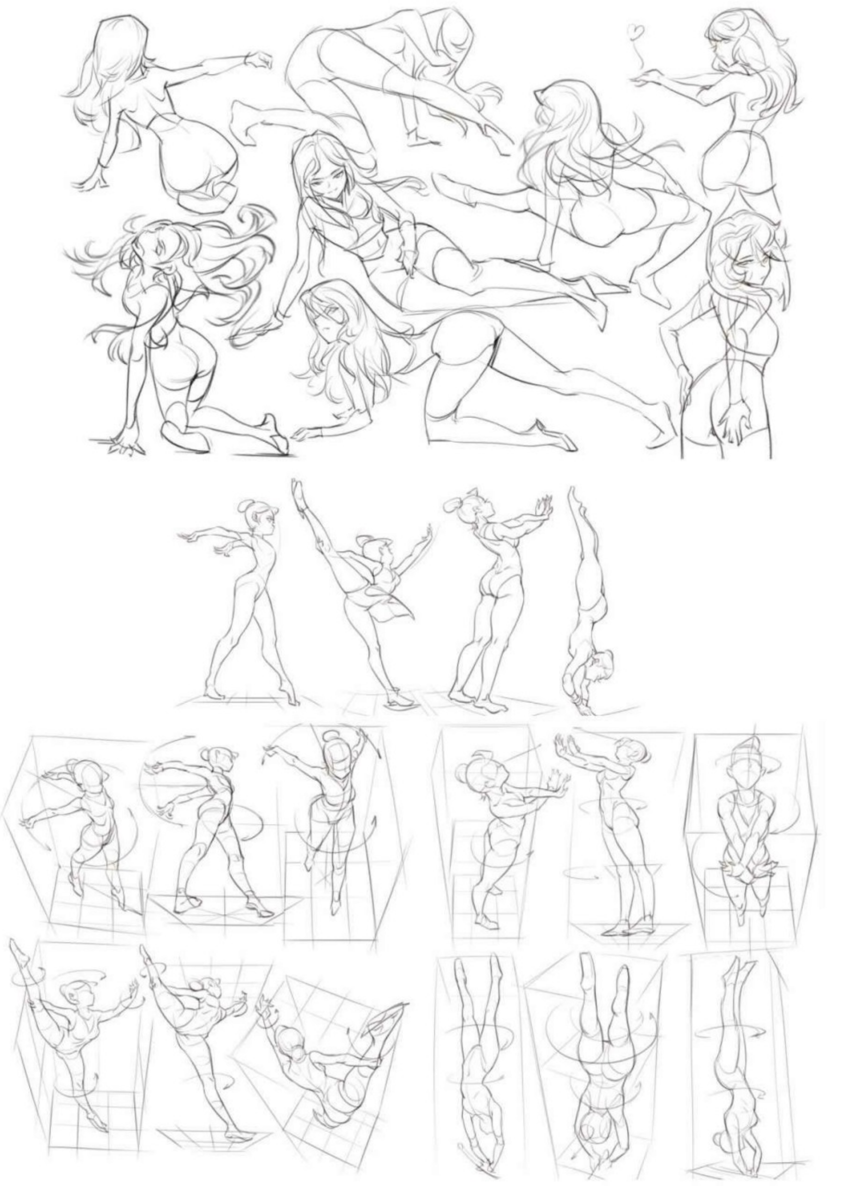


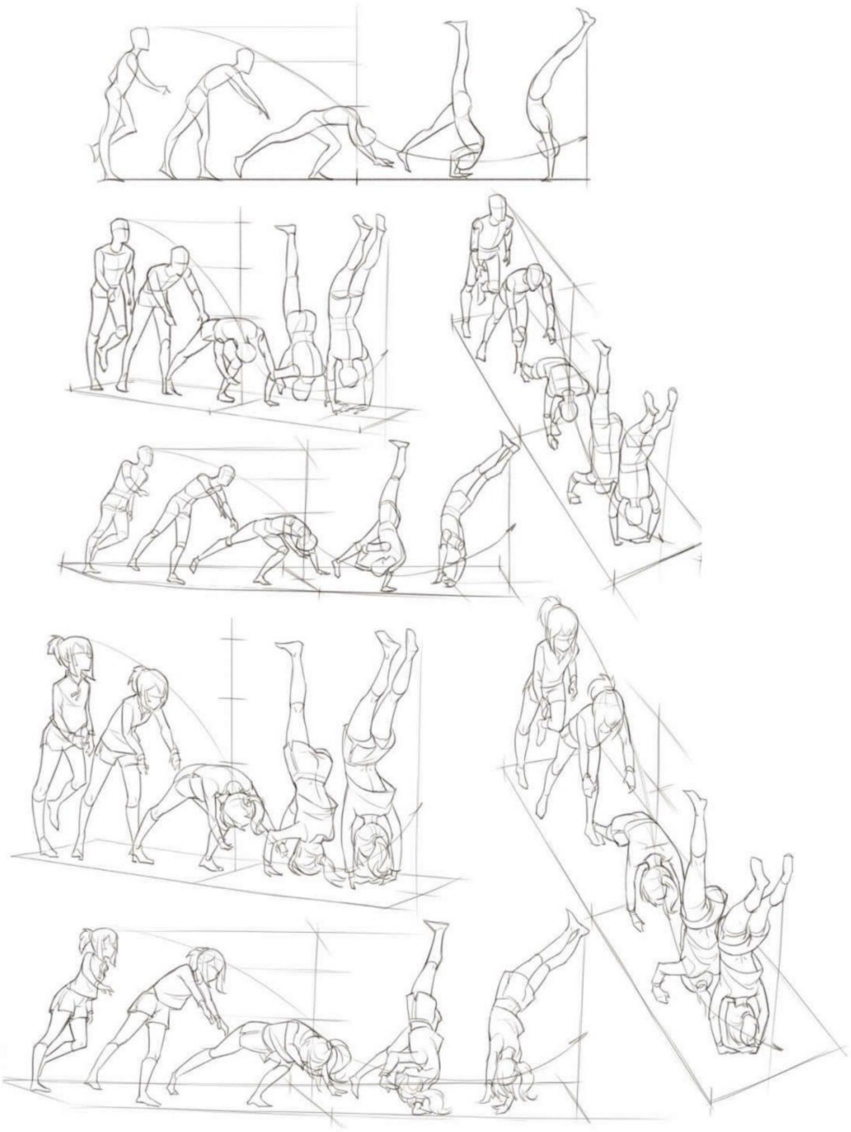
Do a set of exercises involving full-body clothing folds.

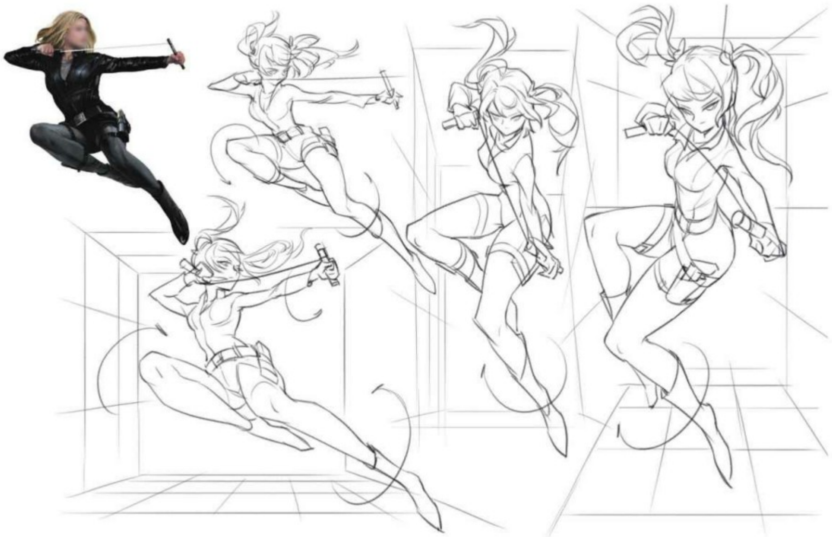


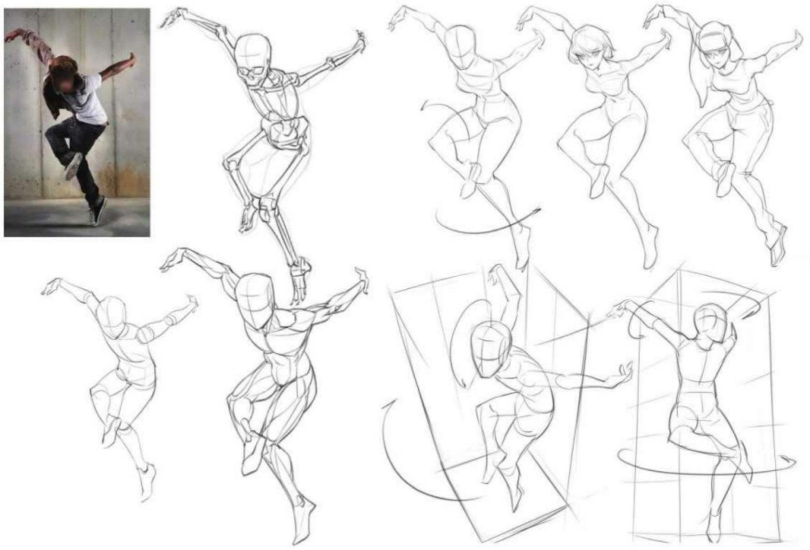


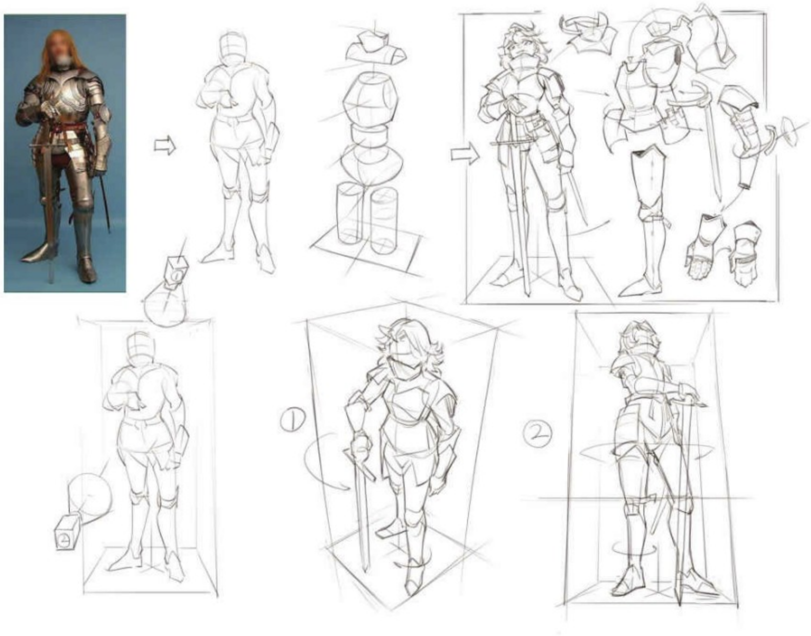








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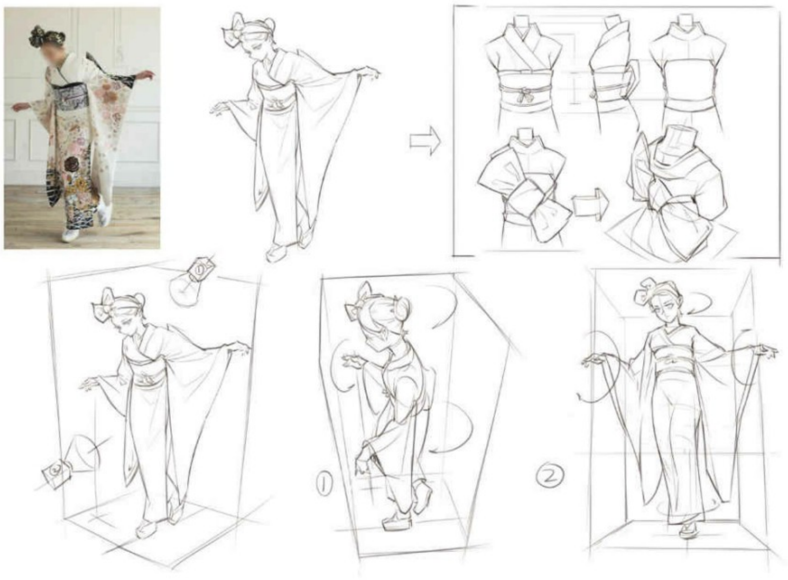
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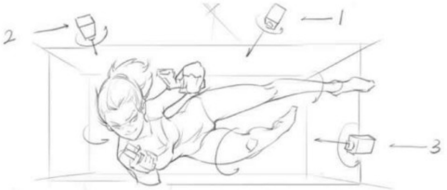
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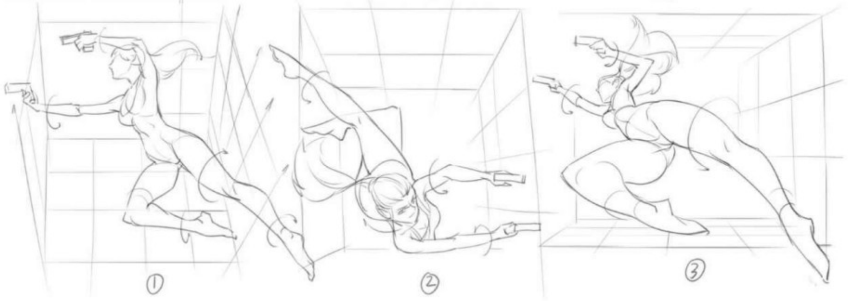
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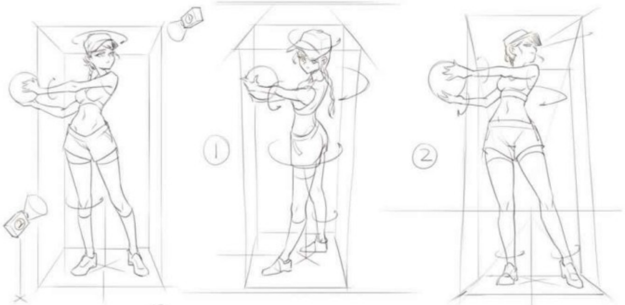
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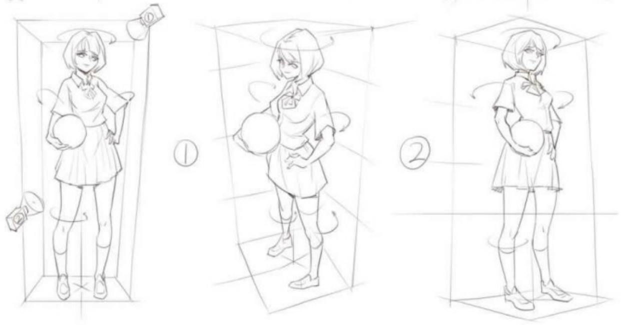
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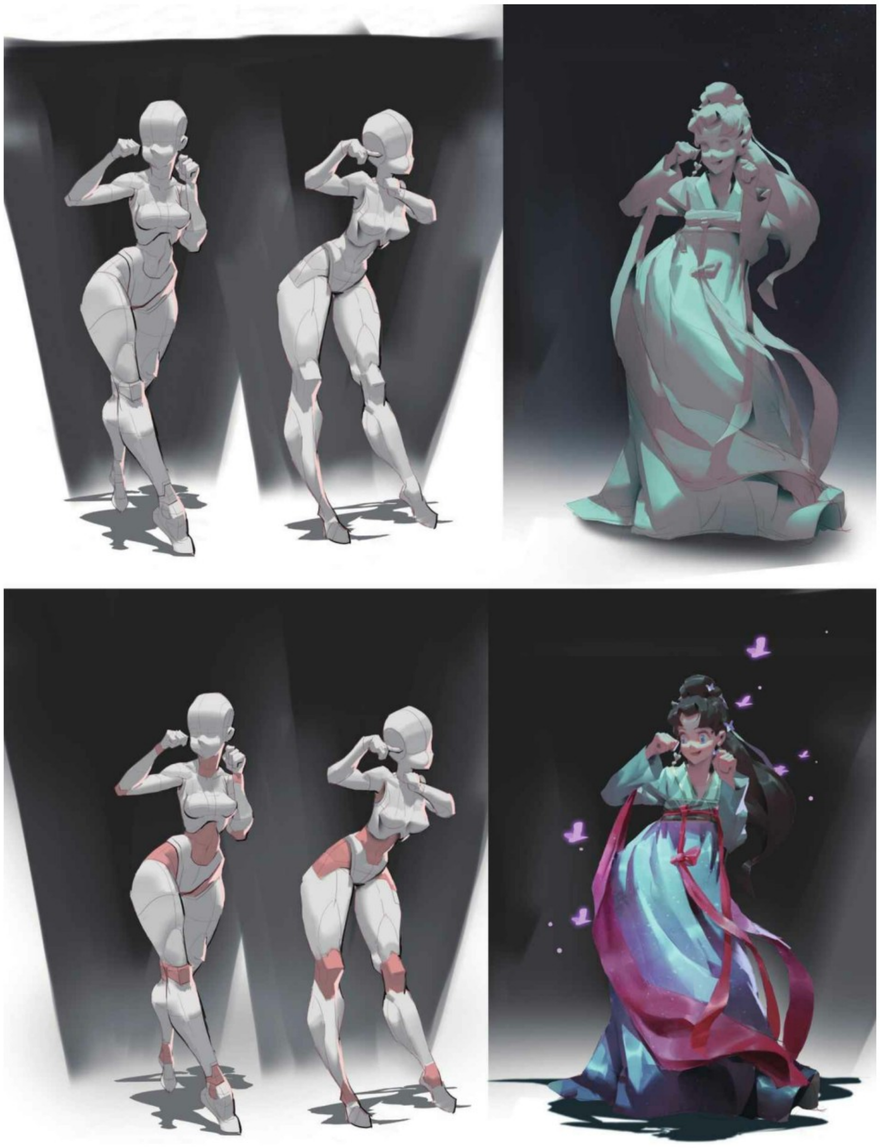

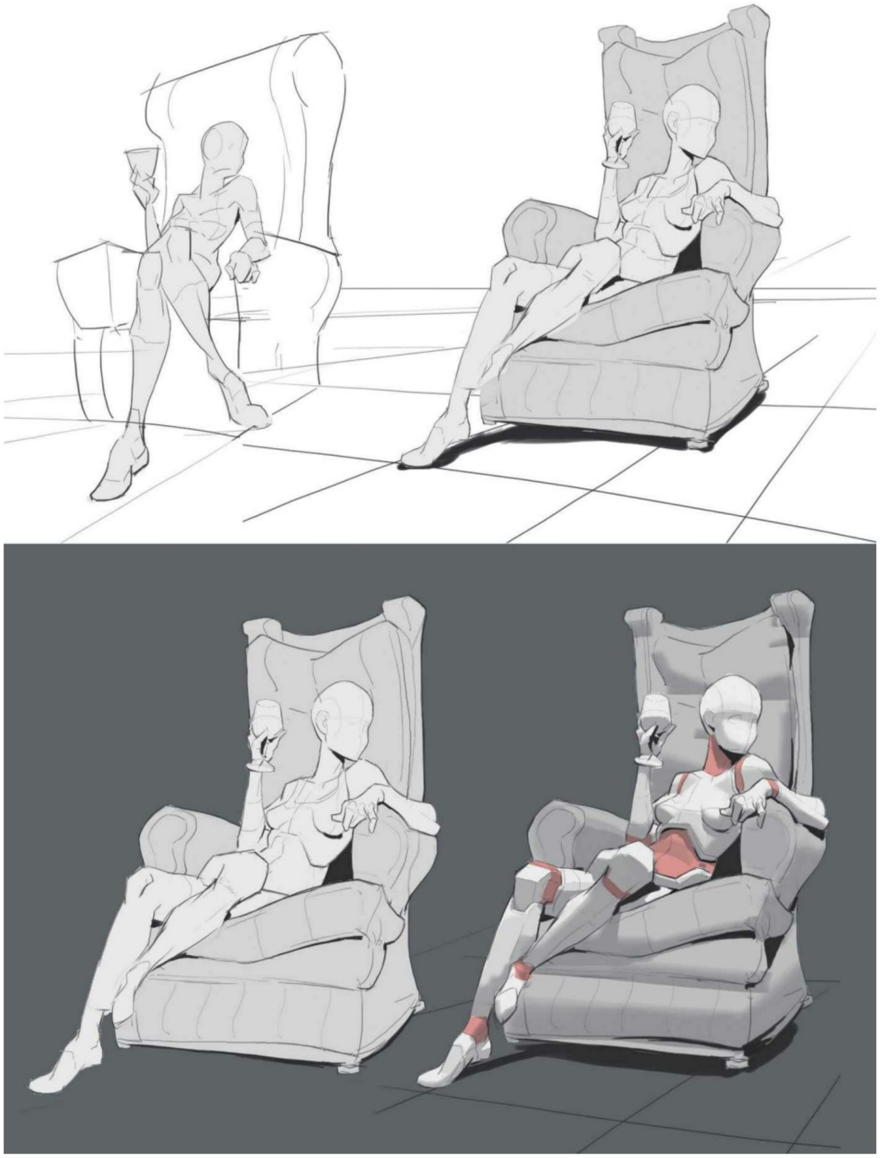

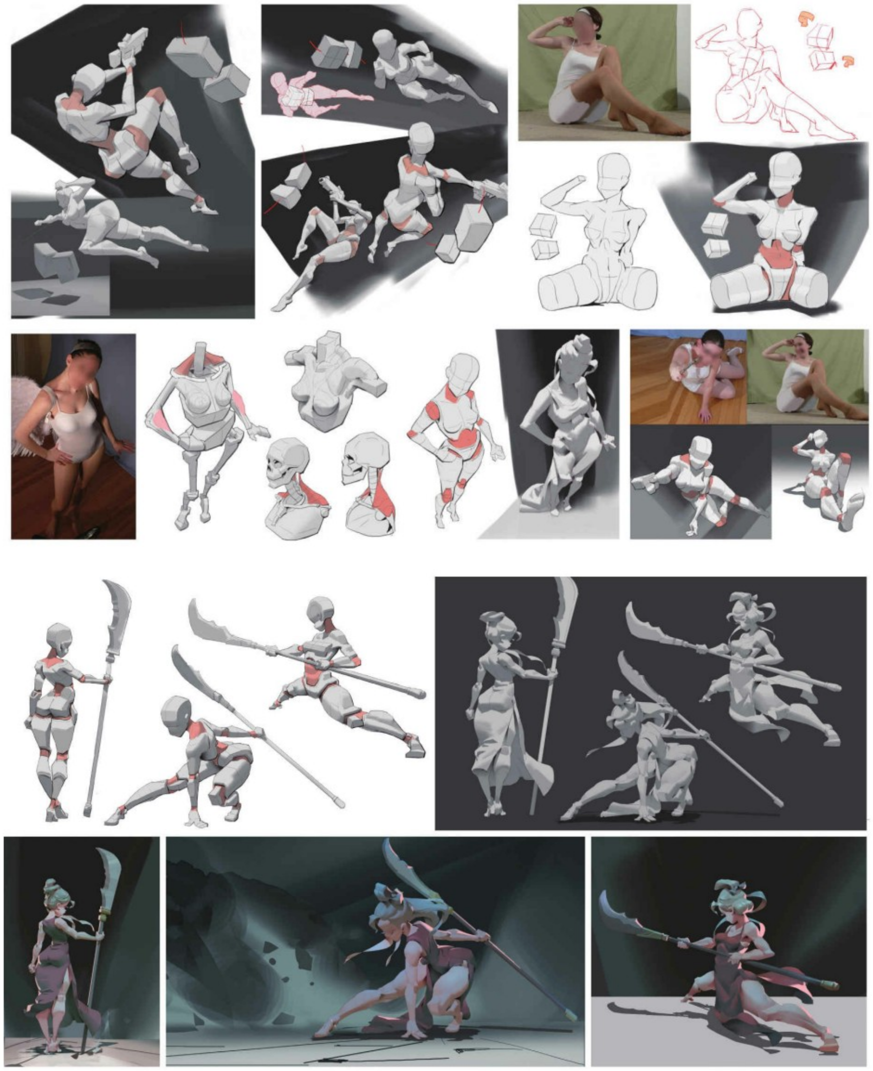

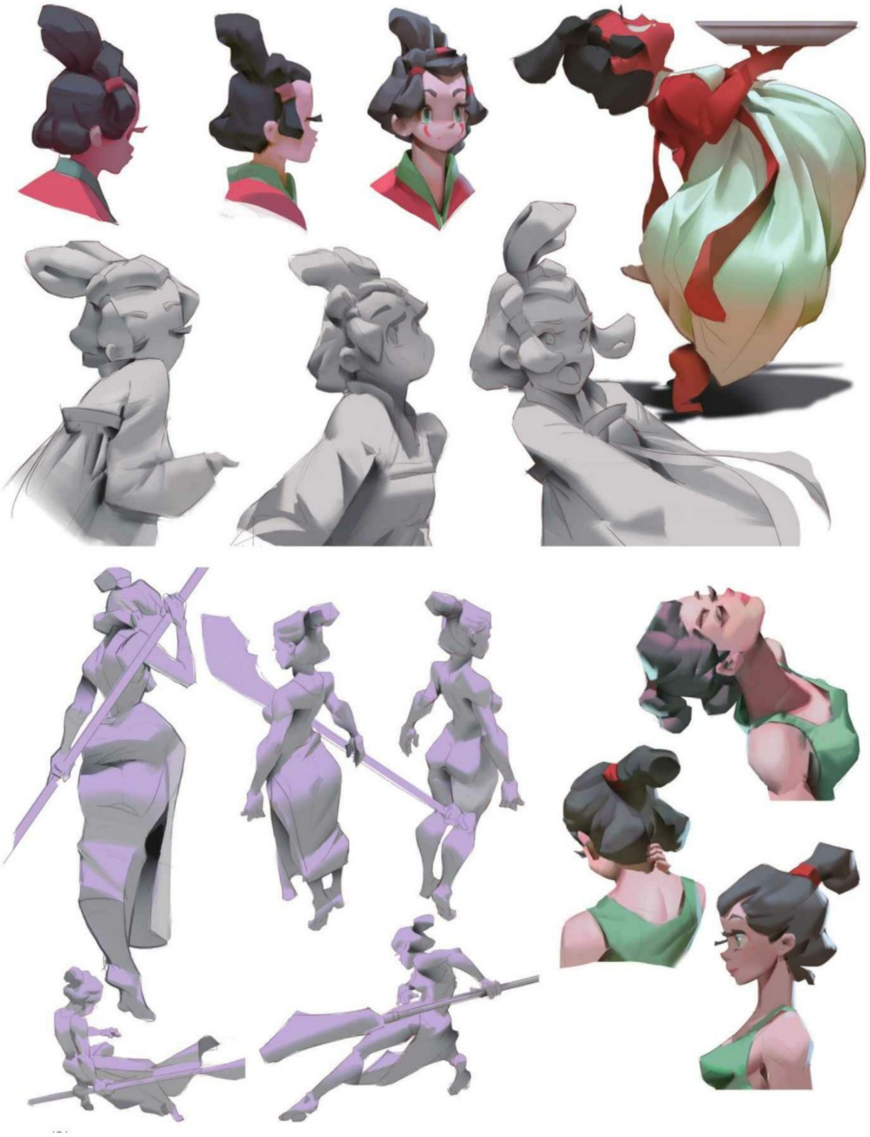

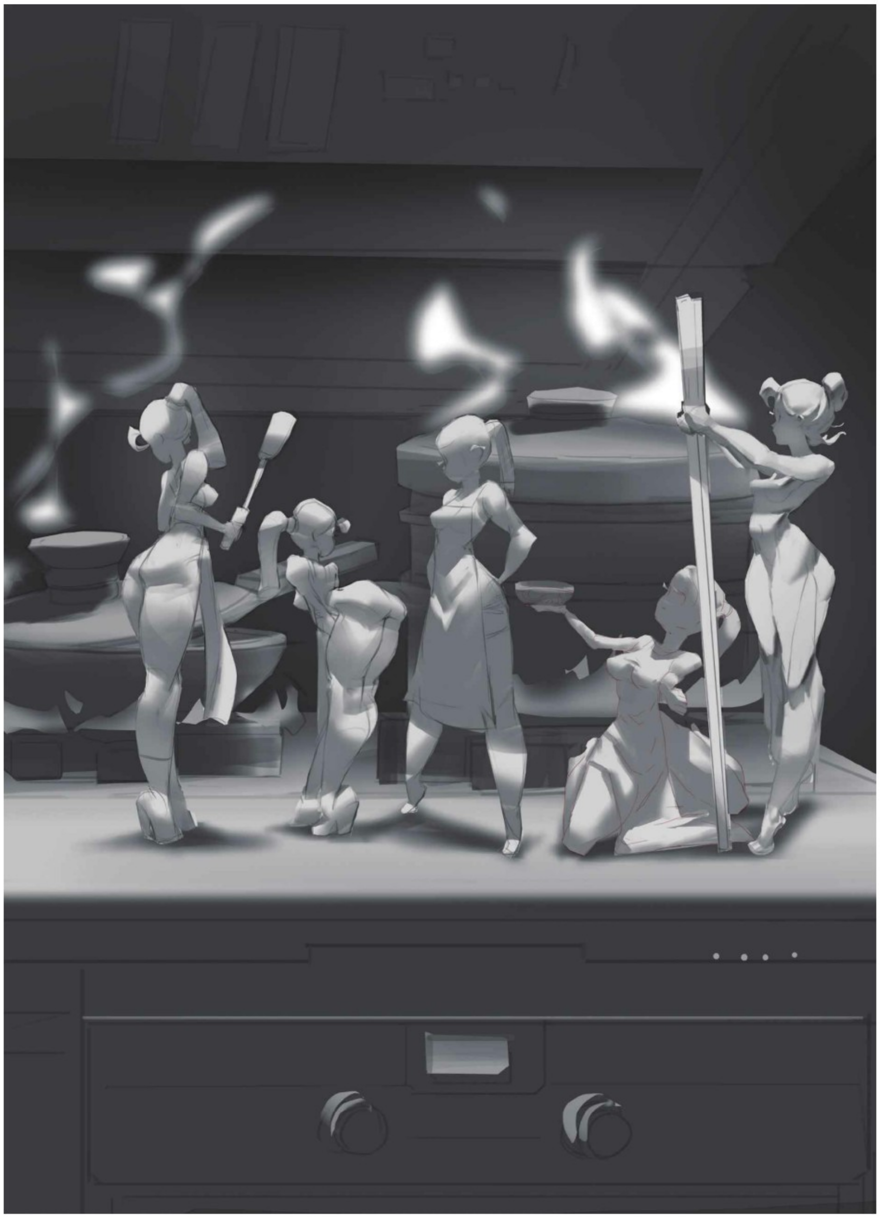

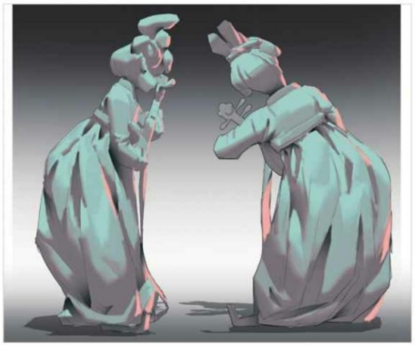

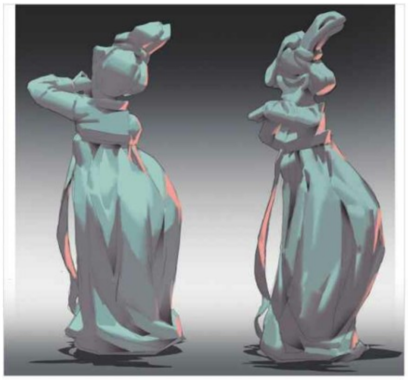

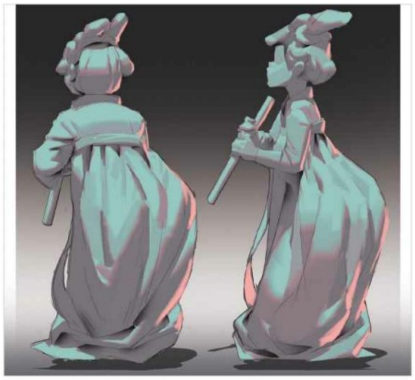

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